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ASSISTED BY GUY A. K. HARSHALL, F Z S . F R.S

MOLLUSCA.-II.

(TROCHOMORPHIDÆ-JANELLI

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G K. GUDE, FZ



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PREFACE.

The first volume of the Land Mollusca, forming part of the 'Fauna of British India' series, and comprising the families of Testacellidæ and Zonitidæ, was issued in 1908 under the joint authorship of the late Dr. W. T. Blanford and Lieut-Colonel H. H. Godwin-Austen.

It was at first anticipated that the second volume would be the joint production of Lieut-Colonel Godwin-Austen and the present writer. Unexpected circumstances have, however, unfortunately deprived me of the advantage of the former's cooperation. This is the more to be regretted as it involves the loss of a considerable quantity of additional anatomical details, the result of his recent researches, which would have greatly increased the value of the present volume, and, further, that his own collection and that of the late Dr. Blanford—both very rich in Indian Mollusca, and both in the custody of the British Museum—have in consequence been inaccessible to me.

Very valuable assistance in the preparation of this work has been rendered by many malacologists, both at home and abroad. Foremost among these I would thank Mr. E. A. Smith and Mr John H. Pousouby for advice on many critical points. The latter, besides giving me free access to his extensive collection, has in addition very kindly looked through the proofs and offered many valuable suggestions. Mr G. C. Leman, the present owner of the late Colonel Beddome's collection—unrivalled in its wealth of Indian shells, has very generously placed much valuable material at my disposal, and Mi. G. C. Robson has greatly facilitated

my research amongst the rich material in the National Collection. Finally, I am under a deep obligation to the following for the loan of specimens from their own collections or from collections in their charge —Mr. John M. Clark, of the State Museum, Albany, New York, Di L. Doncaster, of the University Museum of Zoology, Cambridge, Dr Fritz Haas, of the Senckenbergisches Museum, Frankfurt a/M., Mi. A. S. Kennard, Major A. J. Peile, Mi. F. R. Rowley, of the Royal Albert Memorial Museum, Exeter; Dr R. Sturany, of the Naturhistorisches Hofmuseum, Vienna, and Mr. B. B. Woodward.

G K. GUDE.

London, November, 1914

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ERRATA.

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- , 94, 7th line from the bottom, for Shiroifurar read the Shiroifurar Peak
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- ,, 105, 4th line from the bottom, after Shiroifurar add Peak
- " 343, 15th line from the bottom, for Bacillum daflaensis read Bacillum daflaense
- " 350, 11th line from the bottom, for Curvella scrobiculatus read Curvella scrobiculata.
- ,, 361, 14th line from the bottom, for Opeas? pusillus read Opeas?
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Family TROCHOMORPHIDÆ.

Genus TROCHOMORPHA, Albers.

Trochomorpha, Albers, Die Heliceen, 1850, p 116; Martens, Die Heliceen (ed 2), p 60, ibid, Preuss Exp Ost-Asien, Zool Theil, ii, 1867, p 245. Stoliczka, J A S B 1873, p 20, Pilsbry, Man Conch. (ser 2), ix, 1893, p 1, Godwin-Austen, Proc Malac. Soc London, i, 1895, p 284

Type, Helia trochiformis, Fer, from Tahiti

Range India, Burma, Andaman and Nicobar Islands; Farther India and adjacent islands, China and Formosa; Japan and Loo-Choo Islands; Malaysia; Philippine Islands, New Guinea, Admiralty and Louisiade Archipelagoes, Pelew, Caroline, Marshall, Solomon, New Hebrides, Fiji, Navigator, Tonga, Society, and Sandwich Islands

Original description —"Testa trochiformis, plerumque aperta umbilicata, angulata vel carmata, apice obtusa, striatula, opaca, subsolida, fusca, concolor vel fasciata, anfr. 5–8, supra et infra planati; apertura depressa, obliqua, securiformis vel angustius lunata, peristoma rectum, simplex, margine columellare sæpius paulum incrassato, sensim in basalem transcunte

Maxilla lævis, arcuata, medio sæpius rostrata Pallium non

ultra aperturam testæ productum" (Martens, 1867)

The genus Trochomorpha was established by Albers in 1850 He included sixteen species, not only of Asiatic and Polynesian origin, but also one from Central America, two from the Bermudas, and one from the Canary Islands Of the sixteen species. eleven have since been referred to other genera. No type was In 1860 von Martens, in the revised edition of Albers' work, gave a list of 31 species, having eliminated some and added a number of others, comprising several which have no allinity with the genus. He indicated trochiforms as the type. In the 'Preuss Exp Ost-Asien' he amended and amplified the description, which bears evidence of a better conception of the limits of the group It was, however, left for Prof Pilsbry, in his epoch-making work on the Heliculæ, to place the genus on a sound and permanent basis by giving anatomical details of several forms, and enumerating all the species known at the time Although including it in his work on Helicidæ, he distinctly states that he considers Trochomorpha " a somewhat aberrant genus of Zonutida" Further anatomical details of the genus were contributed in 1895 by Lt-Col Godwin-Austen, who, however, retains the subgeneric name Discus, which, as Pusbry has demonstrated, is not available in this group, Fitzinger having pieviously employed it for H rotundata and its allies, so that Fidena of Albers has to be employed instead

I append anatomical details copied from Pilsbiy's work referred to -

"Animal. Foot long and rather narrow: sole flat, with no trace of longitudinal division, parapodial groove distinct, bounding a wide vertically grooved foot margin, and having a shallower groove above it Tuil depressed above, sounded behind, without a mucus gland Back with several indistinct longitudinal lows of granules, sides irregularly granular Shell lappets none, but mantle having a wide body-lappet on the right and a small one on the left. Lung orifice to the left of the superior angle of aperture

"Genitalia simple, the penis moderately long, somewhat twisted. the retractor muscle and vas deferens entering at the apex. Spermatheca on a short duct Orifice of genitalia near the pedal groove, below and slightly back of the right eye-peduncle Right eve-peduncle retracted between branches of genitalia Kidney

long and narrow.

"In T custra and T. timoi ensis the duct of the spermatheca is very long In all other features of genitalia, jaw, and teeth they resemble the typical Trochomorphas The length of this duct may warrant the retention of the section Swella, Blanf.

"Jaw arcuate, smooth, with a small median projection, or none "Radula central and lateral teeth having the strong mesocones mojecting well over the posterior burders of their basal plates, and lacking ecto- and entocones. Outer lateral teeth at first sinuated outside, the sinuation increasing to a denticle on the transition teeth, and ascending on the mesocone to form the long bifid cusps of

the marginal teeth, which become very oblique.

".... Wiegmann has recently dissected a specimen of T planorbis, Less (Weber's Zool Ergebn Reise Niederl. Ost-Indien, 111, p. 152, 1893). This species shows the lower portion of the vas deferens to be dilated beyond the axis of the penis. where the retractor muscle is inserted The vagina is much swollen between the lower end of the uterus and the opening of the spermatheca duct, and at the upper end of this swollen portion there is inside a whitish gland formed of the one-celled club-shaped follicles This internal vaginal gland has not been noticed in other species Stoliczka has published the anatomy of T. castra and T. timorensis (Journ As Soc. Bengal, xlii), finding these species to have the structure of typical Trochomorpha except for the very long duct of the spermatheca" (Pilsbry)

Godwin-Austen investigated the anatomy of T. trilineatus and

gives the following details:

" Animal —Has no overhanging lobe at the extremity of the foot: the slit of the mucous gland cannot be discerned owing, possibly, to the contracted state of the spirit specimen, though the wide pallial fringe and the shape of the extremity of the foot point undoubtedly to its presence. The animal is black in colour, with a pale foot beneath, and above the pallial margin is finely papillate. The jaw has a central projection. The radula has the teeth arranged +9:11:1·11·9+? It was unfortunately imperfect on both the lateral sides, where the teeth are very small The twenty-two centrals are plain straight-sided teeth, the centre tooth not so broad as those on either side: the laterals

are curved, short, and evenly bicuspid.

"The generative organs.—The vas deferens joins the male organ below the retractor muscle attachment, and at its junction is closely coiled upon itself, this was seen in two specimens dissected. The spermatheca is only of moderate length, and thus these organs have a very distinct construction to that which Stoliczka describes in Swella castra. The other parts of the generative organs do not call for any special mention."

Subgenus SIVELLA, Blanford

Swella, Blanford, A.M. N. H. ser 3, x1, 1863, p. 86. Pilsbry, Man. Conch ser 2, 1x, 1893, p 3

TYPE, Helix castra, Benson.

Range. India and China

Shell depressed, acutely keeled, thin; umbilious wide Sper-

matheca with a long duct

The only species of this group which appears to have been examined anatomically is the type Godwin-Austen states (Proc. Zool Soc 1895, p 450) .- "It differs in every respect from Discus [Tulena], represented by bicolor, sulcipes, &c." refers all the forms from the Andaman and Nicobar Islands to Discus, and as conchologically the two subgenera are indistinguishable, the only logical conclusion appears to be that the contmental species should be classed under Swella and the insular ones placed in Videna, until an examination of the soft parts shall prove the contrary.

1. Trochomorpha castra. Benson

Helix castra, Benson, A M N H ser 2, x, 1852, p 349; Reeve, Conch Icon vii, 1853, pl 172, fig 1160, Hanley & Theobald,

Conch India, 1872, pl 83, figs 1-3

Trochomorpha castra, Stoliczka, J A.S B 1873, p 21, pl 1, figs 1416 (shell), pl. 11, figs 7-9 (anat), Nevill, Hand List, i, 1878, p 56,
Martens, Conch Mitth 11, 1883, p 130, Collinge, Journ Malac ıx, 1902 p 81

Swella custra, Blanford, A. M. N. H. ser 3, x1, 1863, p. 86, Godwin-Austen, Proc Mal Soc London, 1, 1895, p 284, pl. ix, fig. 5

Trochomorpha (Videna) castra, Pfeisser & Clessin, Nomencl Helic Viv 1881, p 84

Helix (Trochomorpha) castra, Tryon, Man Conch. ser. 2, iii, 1887. p 84, pl 16, hgs 5-7

Original description --- T mediocriter umbilicata, depressissimo-como a, tenuis, exiliter oblique acuto-striatula, cornea: spira ad apicem obtusa, sutura marginatis; anfr. 5½ planulati.

ultimo ad peripheriam acutissime carinato, subtus planiusculo; apertura oblique subquadiata, margine acuto

"Diam maj 12, min. 101, axis 4 mill"

Hab Sikkim. Darjeeling (Trotter, Stoliczka & Mainwaring) India: Sinkip Island (Wood-Mason); Calcutta (Stoliczka & Nevill), Sibsagar (Peal); Khasi Ilills and Dafla Hills, Assam (Godwin-Austen), Naga Ilills (Chennell); Cherrapoonjee, Assam (native collector, my collection) Burma Arakan Hills (Kinz), Pegu (Stoliczka) Straits Settlements Penang (Stoliczka), Salang (Weber), Kwala Aring, Kelantan, Malay Peninsula (Skeat Evpedition).

Nevill records an unnamed variety of this species (collected by Wood-Mason) from South Andaman Island (Hand List, 1, 1878, p 56) Lt-Col. Godwin-Austen, who received a specimen from the same collector, believes this to be an immature *T. sams* (P. Z. S.

1895, p 449)

2 Trochomorpha ceryx, Benson.

Helir cery, Benson, A M N II ser 3, 111, 1859, p 184 (reprint, p 1)

Helir (Trochomorpha) caryr (err typ), Tryon, Man Conch ser 2, 111, 1887, p 75

Trochomorpha caryr, Pilsbry, Man Conch ser 2, 12, 1893, p 4

Original description —"Testa perforata turbinato-conica, tenui, intidula, oblique striatula, liris pluribus remotis, striisque confertissimis interpositus spiralibus sculpta, translucente, albida, fascus duabus latis fuscis, superiori prope suturam, altera infia peripheriam, ornata; spira attenuato-conica, apice obtusiusculo, anfractibus 4 convexiusculis, ultimo medio carinato; apertuia obliqua, rotundata, peristomate tenui, acuto, margine columellari verticali anguste reflexo, perforationem subtegente.

"Diam may 6, min 5, axis 5 mill"

Hab Burma Pie Than, Tenasserim.

3. Trochomorpha billeana, Morch

Nanna (Videna) billeana, Morch, Journ Conchyl 1872, p 310, ibid, 1876, p 355

Discus billiung, Godwin-Austen, P Z S 1895, p 442

Original description — "T substantia dura, unicoloi fusca, perspective umbilicata, depressa, subdiscoidea, acutissime carinata; striæ incrementi obsoletæ, lineæ spirales vix detegendæ, supra parum elevata, sutura linearis, expansa, anfra 5½ planiusculi, pone suturam (vel aciem) excavati, ultimus vix descenders, basi convexiusculus Apertura i hombea, peristomate subobliquo, margine subincressato, labro obliquo, obsolete sinuato

"Diam maj 13, min 112, axis 4 mill"

Hub Nicobar Islands Nancowri, Great and Little Nicobar (Reinhardt), Camoria (Roepstorff)

The form collected at Camorta is distinguished by Morch as

var. β , and is stated to be of a brown colour, with a thinner shell The species differs from T. sulcipes principally by the narrower whorls, but the shell is also more solid, the umbilicus is narrower, the keel is sharper owing to the whorls being excavated above and below, while the spiral strike are less numerous and more indistinct.

4 Trochomorpha frauenfeldi, Zelebor

Helix frauenfelds, Pferffer & Zelebor, Verh KK zool-bot Ges xvn, 1867, p 805

Trochomorpha? frauenfeldi, Frauenfeld, Verh. K.K. zool.-bot. Ges. xix, 1869, p 897.

Rotula frauenfeldi, Godwin-Austen, P Z S 1895, p 441.

Original description —"T perforata, lenticularis, acute carinata, tenuis, oblique conferte costulato-striato, parum nitida, translucida, cornea; spira parum elevata, vertice obtuso; sutura linearis; anfr. 5 regulariter accrescentes, planiusculi, ultimus non descendens, infra carinam levissime crenulatam convexus, lævior, midus, apertura obliqua, rhombeo-lunaris; perist. simplex, rectum, margine basali arcuato, ad insertionem breviter triangulatim reflexo.

"Diam maj. 16, min 14, alt 6 mill"

Hab Nicobar Islands (Zelebor); Great Nicobar (Godwin-Austen).

5 Trochomorpha galerus, Benzon.

Helm galerus, Benson, A. M. N. H. ser 2, xviii, 1856, p. 96, Hanley & Theobald, Conch. Ind. 1872, pl. 83, figs. 5 & 6

Trochomorpha castra, var galerus, Nevill, Hand List, i, 1878, p 56 Trochomorpha (Nigritella) galerus, Pfeisser & Clessin, Nomenci Helic. Viv 1881. p 81

Helix (Trochomorpha) galerus, Tryon, Man Conch ser 2, 111, 1887, p 75, pl. 14, figs 2 & 3

Original description.—"Testa umbilicata, subconoidea-depressa, lenticulari, pallide cornea, confertissime oblique striata, strus spiralibus exiguis decussatæ; spira depresse conoidea, sutura impressa, apice obtusiusculo; aufr. 5 lente acrescentibus, convexiusculus, ultimo antice majori, non descendente, peripheria acute carinato, marginato, subtus convexiusculo, margine periomphali obtuse angulato, umbilico profundo, subanguste perspectivo; apertura subsecuriformi; peristomate acuto, marginibus distantibus, columellari brevi, superne reflexiusculo.

"Diam. maj 9. mm 8, axis 4 mill."

Hab. Ceylon. Rogama (E. L. Layard)

6 Trochomorpha hyptrocyclos, Benson.

Helix hyptiocyclos, Benson, A. M. N. H. ser. 3, x1, 1863, p. 89
Patula (Gonyoduccus) hyptiocyclos, Pfeisser & Clessin, Nomencl. Helic.
Viv. 1881, p. 92

Original descriptions.—"H testa latissime umbilicata, orbi-

culato-planata, planoi biformi, depressa, fragili, oblique striatula translucente, polita, olivaceo-cornea; spira concaviuscula, apice foveolato, suturis profundis, anfractibus 4½, gradatim increscentibus, utrinque convexis, ultimo convexiusculo, peripheria subcarinata; apertura valde obliqua, elliptico-lunata; peristomate tenui, acuto, maginibus conniventibus, callo tenui junctis

"Diam maj 6, min 5, alt 1½ mill"

Hab Ceylon · Fort M'Donald (Layard)

7 Trochomorpha percompressa, Blanford

Helia (Swella) per compressa, Blanford, P Z S 1869, p 448
Trochomorpha per compressa, Nevill, J A S B 1877, p 15, ibid, in
Anderson, Zoul Res Exped W Yunnan, 1, 1878, p 873, pl 80,
fig 7, ibid, Hand List, 1, 1878, p 56, ibid, J A S B 1881, pt 2,
p 133, pl 5, fig 22

Helin (Trochomorpha) per compressa, Try on, Man Conch ser 2, m,

1887, p 84, pl 16, figs 8-10

Original description:—"Testa aperta et pervie umbilicata, perdepressa, lenticularis, tenuis, cornea, acutissime carinata, nitida, stilis incrementi oblique curvatis notata. Spira fere plana, apice via exserto, sutura impressa marginata. Anfr 5, convexi, ultimus callina mediana acuta utrinque compressa instructis, cuca umbilicum tumidiol, non descendens. Apertura parum obliqua, securitorinis, peristoma tenué, rectum

"Diam maj 12, min. 101, axis 3 mill'

Hab Burma Bhamo (Anderson), 2nd Irawaddy Defile (Anderson)

Subgenus VIDENA, H & A. Adams.

Videna, II & A Adams, Gen Rec Moll 11, 1878, p 15 (as subgenus of Zonites), proposed in lieu of Discus, Albers, 1850, not of Fitzinger, 1833, Martens, Preuss Exp Ost-Asien, Zool Theil, ii, 1867, p 247 (second group of Trochomorpha), Pilsbry, Man Conch sei 2, 1x, 1893, p 3

Type not indicated First species Helia beckiana, Pfeiffer

Range Islands East of British India, Malaysia, China, Japan,

Philippines, New Guinea

Original description — "Shell widely umbilicated, discordal, keeled flat, or slightly elevated above, convex at the base, last whorl slightly deflexed at the aperture; peristome simple, acute, or slightly marginate, the margins arcuated." (Adams.)

8 Trochomorpha andamanica (Nevill), Godwin-Austen

Discus and amanica (Nevill), Godwin-Austen, P Z S 1895, p 448 Trochomorpha (Videna) and amanica, Fulton, A M N H set 6, 1897, p 212, pl 6, fig 4.

"Shell subcircular, light vellowish brown, umbilicus wide funnicl-shaped and sharply angled, whorls 6½, slowly increasing,

suture bordered with a depressed and well-defined narrow margin, obliquely striated by growth-lines above and below, last whork compressed at the margin and acutely keeled; aperture very oblique, hip slightly thickened

"May diam. 14 millim, height 41 millim, width of umbilicus

5 millim" (Fulton)

Hab. Andaman Islands: Port Blair.

9. Trochomorpha bicolor, Martens.

Trochomorpha bicolor, Martens, Monatsber. Kön Akad Wiss Berlin, 1864, p 267; ibid, Preuss Exp Ust-Asien, Zool. Theil, 11, 1867, p 252, pl 13, fig 2, Nevill, Hand List, 11, 1878, p 67.

Namna (Videna) bicolor, Morch, Journ Conchyl. 1876, p 356

Helix (Trochomorpha) bicolor, Tryon, Man Conch ser 2, in, 1887, p 82, pl 16, figs 83-85

Discus bicolor, Godwin-Austen, Proc Malac Soc London, 1, 1895, p 285, pl 19 fig 3 (anatomy); ibid, P Z S 1895, p 442

Trochomorpha (Videna) bicolor, Pfeiffer & Clessin, Nomencl. Helic.

Viv 1881, p 83, Wiegmann, Abh Senck. Naturf. Ges xxiv, 1898, p 419, pl 27, figs 1-18 (anatomy)

Original description.—"Testa modice umbilicata, depresse conica, carinata, striatula, nitida, supra lineis spiralibus subtilibus sculpta, castanea, zona suturali, carina et regione umbilicali albidis, spira altitudine varians; anfr 5½-b, convexiusculi, ultimus peripheria carinatus et basi prope umbilicum subangulatus, antice haud descendens, apertura diagonalis, securiformis; peristoma rectum, acutum, margine basali arcuato

"Diam maj 13, min. 12, alt. 5-6, apert long. 5, lat 4 mill."

Hab. Nicobar Islands Teressa and Katchal (Roepstorf);

Preparis Island (var.) (Wood-Mason); Malaysia Sumatra,

Borneo. Lombok.

10. Trochomorpha iopharynz, Mörch

Nanina (Videna) topharynx, Morch, Journ Conchyl 1876, p 356. Discus topharynx, Godwin-Austen, P. Z S 1895, p 442

Original description.—"T. depressa, lite umbilicata, brunnea, linea, suturali subtilissima, alba; striæ incrementi irregularis, rudes, præsertem superne; labio crassiusculo, faucibus violascentibus, iridescentibus

"Diam. maj. 16 millim.; diam. min. 14; alt. 8."

Hab. Nicobar Islands, Katchal (Roepstorpf)
Based on a sugle specimen. Morch states

Based on a single specimen. Morch states that Trochomorpha timorensis, Martens, gives a good idea of this species, but that the figure given by von Martens (Ost-As. pl 13, fig 6) shows a much narrower umbilicus

11. Trochomorpha lardea, Martens

Helix zollingeri, Mousson (non Pfeisser), Zollinger, Natuurk Tijdschr Nederl Indie, xxi, 1860, p 317 (nom. nud) Trochomorpha lardea, Martens, Monatsber Kon Akad Wiss Beilin, 1864, p 267, ibid, Preuss Exp Ost-Asien, Zool Theil ii, 1867, p 251, pl 13, fig 5, Nevill, Hand List, i, 1878, p 57 Helia (Trochomorpha) lardea, Tryon, Man Conch sei 2, iii, 1887, p 83, pl 16, figs 93-95

Trochomorpha (Videna) lardea, Kobelt, Abh Senck Naturf Ges xxiv, 1898, p 54, Wiegmann, tom cit p 415, pl 26, figs 24-34

(anatomy)

Original description —"Testa modice umbilicata, depresse conica, carinata, striatula, nitida, supra lineis spiralibus subtilibus sculpta, castanea, zona suturali, carina et regione umbilicali albidis, spira altitudine varians, anfr 5½-6, convexiusculi, ultimus peripheria carinatus et basi prope umbilicum subangulatus, antice haud descendens; apertura diagonalis, securiformis, peristoma rectum, acutum, margine basali arcuato

"Diam maj 13, min 12, alt 5-6, apert long 5 lat 4 mill"

Hab Nicobar Islands (Stoliczka, Roepstorff) Malaysia Ceram,

Buru, Amboina, Halmaheira

12 Trochomorpha pseudosanis, Fulton

Discus pseudosams (Nevill), Godwin-Austen, P Z S 1895, p 442 (nom nud)

Trockomorpha (Videna) pseudosanis (Nevill), Fulton, A M N H sei 6, xx, 1897, p 213, pl 6, fig 5

Original description.—"Shell openly umbilicate, dark brown, obliquely striated above and below, whoils $5\frac{1}{2}$, slowly increasing, suture with a narrow well-defined margin, last whorl sharply keeled, aperture oblique; peristome scarcely thickened.

"Maj diam. 13 millim, height 5 millim, width of umbilicus

4 millim"

Hab Andaman Islands Port Blair

13 Trochomorpha sanis, Benson

Helix sanis, Benson, A. M. N. H. sei 3, vii, 1861, p. 84, Hanley & Theobald, Conch. Ind. 1872, pl. 83, figs. 4 & 7
Trochomorpha sanis, Nevill, Hand List, 1, 1878, p. 56
Helix (Trochomorpha) sanis, Tryon, Man. Conch. ser. 2, 111, 1887, p. 84, pl. 16, figs. 3, 4
Discus sanis, Godwin-Austen, P. Z. S. 1895, p. 442

Original description — "H testa mediocriter umbilicata, conoidea-orbiculata, depressissima, lenticulari, oblique subarcuatim striatula, subgranulata, cornea, spira pai um elevata, conoideo-depressa, apice obtuso, sutura impressiuscula, marginata; anfiactibus 5½ subplanulatis, ultimo carina mediana acuta utrinque compressa munito, subtus convexiusculo, apei tura obliqua, securitormi, peristomate recto, acuto; umbilico intundibuliformis

"Diam maj 11, minor 10, axis 3½ mill"

Hab Andaman Islands Port Blair (Nevill, Roepstorff)

1! Trochomorpha subnigritella, Beildome

Trochomorpha subnigritella, Beddome, P. Z.S. 1891, p. 314, pl. 29, hgs. 4-6, Pilsbry, Man Conch. ser. 2, vm, 1893, p. 127, pl. 43, hgs. 44-46

Discus subnigritella, Godnin-Austen, P. Z S 1895, p 142

Original description —"Shell moderately umbilicate, depressedly turbinate, quite rounded at the apex; whorls 6, very gradually increasing, faintly stricted, the last sharply angled at the periphers, nearly flat on the underside, aperture oblique, subquadrate, peristome simple, the margins distant, colour a rich dirk brown, shining below.

"Drameter 1 mich [=12.75 mm], height 1/4 mich [=8 mm]

"This species recalls the Pacific forms of the genus rather than the Indian ones, its nearest ally being P nigritella, which, however, is a larger shell with the last whorl much broader"

Hab Andaman Islands (Hungerford), South Andaman (Godwin-

Austen)

15 Trochomorpha sulcipes, Morch

Nanna (Videna) sulcipes, Morch, Fourn Conchyl 1872, p. 309 Discus sulcipes, Godwin-Austen, P. Z. S. 1895, p. 142 Invehomorpha sulcipes, Nevill, Hand List, 1, 1878, p. 57

Original description — T tenuis, unicolor fusca, perspective unbilicata, depressa, subdiscoidea, acute carinata, strim incrementi expressa presertim superne, spiraliter obsolete lirata, spira vix elevata, sutura linearis, marginata, aufr 5½ convexiusculi, ultimus descendens, basi convexiusculus, apertura reniformis, peristomate obliquo, margine supero incrassato, infero reflexo, labio recto, tuberculo (morbo?) obsoletissimo

"Diam. maj 13 mill, min 11, axis 5 mill"

Hab Nicobar Islands (Stoliczka, Roepstorff), Nancowry (Reinhardt)

Var. major, Morch, tom cit p 309.

"T major, tenuior, planior, peristoma tenue (nondum completum?); anfr. ult vix descendens, umbilico majore

"Diam. maj 15 mill, min 12, axis fere 5 mill"

Hab Great and Lattle Nicobar (Reinhardt)

"Animal solea pedis sulco inediano longitudinali postice cochleariformi excavata, notaum sulco profundo, peripherico postice carinato. Porus caudalis, ut mihi videtur, vix cornutus (exspecim in spiritu conservato). T feta anfr primi tres brunnei sei le macularum albarum."

T. sams, Bens, differs in having the spire nearly plane, and in the growth-lines on the upper side being much stronger

16. Trochomorpha trilineata, Morch.

Nanna (Videna) sulcipes, var. trilineata, Morch, Journ. Conchyl 1876, p 355

Discus sulcipes, var trilineata, Godwin-Austen, P.Z S 1895, p 442 Discus trilineatus, Godwin-Austen, Proc Malac Soc London, 1, 1895, p. 285, pl 19, fig 2 (anatomy)

This form was originally described as a variety of *T. sulcipes*, and a very short description of it was given by Morch: "T. pallida, carina candida, utrinque linea brunnea." Lt -Col. Godwin-Austen in P. Z. S. 1895, also considered it a varietal form only, but in Proc Malac. Soc London he raised it to specific rank, at the same time giving an account of its anatomy. There is a discrepancy as to habitat, for in the latter paper he mentions Great Nicobar, whereas in the former Camorta is indicated, which corresponds with the original locality given by Morch

Hab Nicobar Islands Camorta (Roepstor ff).

Family ENDODONTIDÆ, Pilsbry.

Subfamily THYSANOTINÆ, Godwin-Austen

Genus THYSANOTA, Albers.

Thysanota (as section of Nanna), Albers & Martens, Die Heliceen, ed 2, 1860, p 63, (as section of Trochomorpha) Pfeiffer, Malak Blatt xxiv, 1877, p 7, (as section of Eulota) Pilsbry, Man Conch ser 2, ix, 1895, p 207, Godwin-Austen, Moli India, ii, 1907, p 189

TYPE, Helia guerra, Pfeiffer.

Range Southern India and Ceylon

Original description —"Testa anguste umbilicata, trochiformis, tenuis; anfractus 7½ vix convexiusculi, basi carinati, pilis rigidis ciliati, ultimus interne subplanatus, medio impressus, apertura angulato-lunaris, peristoma simplex, acutum, margine columellari

brevissime expansiusculo"

Until the anatomy of *T. crimigera* was investigated by Lt-Col Godwin-Austen in 1907, and its relation to Endodontidæ established, the systematic position of the genus had remained uncertain Von Martens placed it between *Rotula* and *Nigritella*, Pfeiffer classed it under *Trochomo pha*, while Prof Pilsbry with some doubt considered it as having affinity with *Plectot opis*, and he therefore ranged it under *Eulota* as a section. *Thysanota*, *Philalanka*, and *Ruthvenia*, on conchological grounds alone, form a very natural group, as proposed by Godwin-Austen (subfamily Thysanotinæ), and one wonders how this idea has not occurred to anyone before

17. Thysanota tabida, Pfeiffer.

Helix tabida, Pfeiffer, Malak Blätt 11, 1855, p 106, 1bid, Novit Conch. sei 1, 1, 1855, p 45, pl 12, figs 11, 12

Trochomorpha tabida, Pleister, Maiak Blatt ii, 1855, p. 192.
Namia (Thyramota) tabida, Novill, Hand List i, 1878, p. 54
Ryssota tabida, Pleister & Clessin, Nomenel Helic Viv. 1881, p. 53
Trochomorpha (Thyramota) tabida, Tryon, Man. Conch. ser. 2, m,
1887, p. 94, pl. 10, figs. 97, 93
Lulota (Thyramota) tabida, Pilsbry, Man. Conch. ser. 2, ix, 1895,
p. 208

Original description:—"T angustissime umbilicata, turbinata, solidula, conferte rugoso striata, sub epidermide decidua, fuscula alba, spiri convexo-conica, acutiuscula, aufr 8 lentissime accrescentes, vix convexiusculi, ultimus non descendens, peripheria subangulatus, superne convexus, basi planiusculus; apertura vix obliqua, depressa, subangulato lunaris; perist simplex, rectuin, margine basali versus insertionem leviter incrassato

"Diam. may 171, mm 16, alt 11 mill"

Hab India . Nilgiris.

Pfeisier recognized the assimity between the present species and T. querim. It is, however, larger than the latter and not keeled, while the whorls are more tunid and the umbilicus is narrower, the aperture is also different, being rather semilurate, the columilar margin ascending more obliquely.

18 Thysanota guerini, Pfeiffer.

Helice guerom, Pfeisser, Rev. Zool 1842, p. 304, abid, in Philippi, Abb Beschr Conchvi i, 1844, p. 12, pl. 3, fig. 6, abid, Conch Cab, Heliceen, n, 1853, p. 121, pl. 87, tigs. 15, 16, Reeve, Conch Icon vn, 1852, pl. 85, fig. 457, Hanley & Theobald, Conch. Ind. 1870, pl. 55, fig. 1

Nanua (Thysanota) guerun, Martena, The Heliceen, ed 2, 1-60, p. 63, Nevill, Hand Lat, 1, 1878, p. 51

Trochemorphu guerini, Kobelt, ill Conch Buch 1879, pl 63, fig 11. Trochemorpha (Thysanota) guerini, Pfeisse & Clessin, Nomencl

Helic Viv 1881, p 82

Helix (Thysanota) querini, Tryon, Man Conch ser 2, 111, 1867,
p 93, pl 18, figs 95, 96

Eulota (Thyeanota) guerum, Prisbry, Man Conch ser 2, 12, 1895, p 208

Thysanota guerini, Godwin-Austen, Moll India, ii, 1907, p. 189

Original description — "T. umbilicata, trochiformis, epidermide fusca, rugosa induta; aufr. 7½ vix convexiusculi, basi carinati, carina pilis confertis dense ciliata; basis convexiuscula; umbilicus angustissimus, pervius, apertura lata, lunaris; peristoma simplex, marginibus callo tenuissimo, nitido junctis

"Diam ming. 16, min 15, alt 10 mill"

Hab India. Nilgines (Periottet, Blanford); Anamullays (Bed-

dome).

In his original description, Pfeisfer gave the following dimensions Diam 22, alt 13 mill Subsequently (Mon. Helic Viv 1, 1847, p. 118), the measurements quoted above were indicated without reference to the previous figures. I assume the later ones to be correct.

19 Thysanota flavida, Gude

Thysanota flavida, Gude, Proc Malac Soc London, 11, 1914, p 52, text-figure

Original description — "Shell narrowly umbilicate, depressed trochiform, finely plicate-striate, pale yellowish-corneous Spire subconvex, suture impressed, apex obtuse Whorls 6½, increasing slowly and regularly, convex above and below, carnated, the carna exserted, except in the protoconch, with a raised spiral thread a short distance above the carna and densely crowded with impressed spiral lines, more distinct on the under than on the upperside, the carna and spiral thread fringed with deciduous coarse cuticular processes, resembling flattened hans. Aperture oblique, securiform; peristome acute, the outer margin subconvex, basal arcuate, columellar almost vertical, slightly dilated

"Major diam 12, minor 115 mm . alt 7 mm"

Hab India Nilgiries (Beddome).

A specimen received from the late Col Beddome as T or imgera,



Fig 1 - Thysanota flavida (From Proc Malac Soc London)

proved upon examination to differ from that species in being more convex and more elevated in the spire, in the whorls being more convex, and in the narrow ambilities; the keel is also more exserted, while the plicate transverse strice are much less pronounced, those in crangera being almost lamellate. Mr Ponsonby possesses two immature specimens which I also refer to the new species. They were likewise received from Col Beddome as crangera and, although labelled only South India, are probably from the same locality.

20 Thysanota crinigera, Benson

Helir crimgera, Benson, A. M. N. H. ser 2, v, 1850, p. 214, Reeve, Conch. Icon. vn, 1852, pl. 125, fig. 746, Hauley & Theobald, Conch. Ind. 1870, pl. 60, fig. 7

Thysanota crimgera, Godwin-Austen, Moll. India, 11, 1907, p. 189, pl. 112, fig. 2 (anatomy)

Original description — "T anguste umbilicata, depresso-trochiformis, cornea, radiato-costulata, apex obtusiusculus, anfr. 6-6½ vix convenusculi, linea unica elevata supersuturali minuti, ultimus carinatus; carina suturaque pilis elongatis ciliatis, basis planiuscula, ad umbilicum compressiuscula, lineis impressis concentricis frequentibus ornata, apertura obliqua, angulato-lunaris, securiformis, perist simplex, acutum

"Diam. maj. 121, min. 12, alt 61 mill."

Hab India: Nilgiries (Jerdon)

Nevill organily regarded crinigera as an immature form of guernii (Hand List, i, 1878, p. 54). According to Lt.-Col. Godwin-Austen (L. c. p. 190), he subsequently considered it distinct. In this he was, judging from the descriptions, quite justified. The shell of T. crinigera, besides being smaller, is more depressed, has more flattened whorls, and the raised spiral line above the perphery is a conspicuous feature which is lacking in T. guerini

21 Thysanota cumita, Syler

Thysanota (*) cumita, Sykes, Proc. Malac. Soc. London, 11, 1899, p. 72, pl. 5, fg. 17, 18 Godwin-Austen, Moll. India, 11, 1907, p. 189

Original description —"Testa depresso-comer, anguste umbilicata, corneo virescens, depresso-trochiformis, upice obtusulo; sutura impressa; anfr 5-51, plano-convexi, linea unica spiralis supersuturalis muniti, transversin subtiliter struta, ultimus carinatus, carina suturaque pilis elongatis ciliatis oriata, basi subinflatus, apertura angulato-lunaris, peristoma simplex, rectum

"Diam 12 inm alt 2 min"

Hab Ciylon Ambagamuwa; Badulla (Collett)

Is said to resemble a young T gueron, but is more trochiform and not so convex.

22. Thysanota hispida, Syles

Thysanota hapida Syles, Proc Malac Soc London, in, 1893, p. 160, pl. 10, fig. 2, Godwin-Austen, Moll India, 11,11907, p. 183

Original description —"Testa troclusormis, periostrico susco, rugoso, induta, basi impressa, imbilicus angustus, pervius; apex mediocris, applanatus; ansi 6-6½, consexi, lira unica spiraliter sculpti, ultimus basi carinatus, lira carinaque pilis longis dense notate, apertura lata, lunaris, peristoma simplex, marginibus callo tenuissimo junctis

"Diain max S, alt 5 mm"

Hab. Ceylon Haputale (Collett)

Differs from T. quermi in shape and size, the single spiral thread is clothed with club-shaped hairs

23 Thysanota elegans, Presion

Thysanota elegans, Presion, Rec Ind Mus in, 1909, p 135, pl 22, iig 19

Original description —" Shell trochiform, rimite, vitreous, vellowish white; whorly 6, the first two rounded, spirally striate, the remainder sculptured with fine spiral lines crossed by coarser, transverse, arcuate strike and bearing a strong, peripheral, hairy liration, the last whorl sharply carnate at the base, base of shell

spirally structe only, sutures deeply impressed; umbilicus very narrow, peristome simple; aperture narrow sublunate.

"Diam. maj. 15 mm; alt 175 mm"

Hab Ceylon Uda Pussellawa

Mr Preston compares this species with T hispida, Sykes, from which it differs by its much smaller size and more graceful form, while the spiral and arcuate transverse striæ, which characterize his shell, are lacking in the latter.

Genus GLYPTAULAX *, g. n.

Shell discoid, umbilicated, with close revolving hire and sulcations, decussated by oblique costules. Anatomy unknown.

TYPE, Helix as tificiosa, Benson

Range. Burma

23 a Glyptaulax artificiosa, Benson.

Helia artificiosa, Benson, A. M. N. H. ser. 2, xviii, 1856, p. 249.
Pfeiffer, Novit Conch. ser. 1, 1, 1860, p. 131, pl. 36, figs. 8-10,
Ilanley & Theobald, Conch. Ind. 1870, pl. 55, fig. 3

Heli't (Patula (Punctum)) artificiosa, Tryon, Man. Conch ser 2, 111, 1887, p 33, pl 7, fig 82

Nanina artificiosa, Nevill, Hand List, 1, 1878, p 54

Original description —"Testa anguste umbilicata, orbiculata, discoidea, nitidiuscula, superne liris confertis sulcisque piofundis spiralibus, costulisque confertis obliquis decussata, subtus liris remotioribus striisque radiatis ornata, pallide cornea; spira planulata (interdum omnino planata), apice vix elevato, obtuso; sutura profunda, anfractibus 6½ convexiusculi, lente accrescentes, ultimus superne subangulatus, subtus convexus; apertura vix obliqua, subanguste lunaris; peristomate acuto, leviter sinuato, margine dextro arcuato, crenulato, columellari brevissimo et basali substricto leviter reflexis

"Diam. m'aj 14, min. 12, alt. 5 mill" Hab. Burma Tenasserim (Theobald).

The species is unlike any other known to us and its systematic position is doubtful. The anatomy is unknown. It is placed provisionally in the subfamily Thysanotinæ between Thysanota and Philalanka.

Genus PHILALANKA, Godwin-Austen.

Philalanka, Godwin-Austen, Proc Malac Soc. London, 111, 1898, p 11 (as subgenus of Endodonta), 1bid, Moll India, 11, 1907, p 190

Original description —"Shell small, many-whorled, pyramidal or trochiform with a single hiration, unicoloured. Jaw composed of numerous squarish plates. Basal plates of teeth of the radula

^{*} γλυπτω curved, and αυλαξ furrow

square or oblong; central teeth tricuspid, laterals multicuspid. No nucous gland at the extremity of the foot. Generative organs simple No amaterial organ and no accessory organs"

Type, P. secessa, Godwin-Austen

Range South India and Ceylon, Islands off the West Coast of Sumatra.

In describing the type species, Lt-Col Godwin-Austen alludes to the interesting fact that this is the first record of the occurrence in India of this group of shells. He further states that "nothing like it has been found to the east of the Bay of Bengal, on the North-east frontier, or in Burma, but the possibility of its being a casual introduction is removed by the discovery of another allied species in the south of the Indian Peninsula by Colonel B-ddome" Since the foregoing remarks were written two species have, however, been discovered in the Batu Islands off the West Coast of Sumatra. They were subsequently described and figured in the 'Mollusca of India,' part 10, where two other Cingalese species, previously referred to Microcystis and Macrochlamys respectively are included in Philalanka

24 Philalanka bilirata, Blanford.

Helix bilirata, Blanford, T.A. S. B. XX, 1861, p. 352, pl. 1, fig. 7 Nanna (Sitala) bilirata, Tryon, Man. Conch. ser. 2, 11, 1886, p. 56 Sitala bilirata, Godwin-Austen, Moll. India, 1, 1882, p. 40

Orninal description —" Testa perforata, globosa, turbinata, solidiuscula, cornea, transverse striata, spira conoidea, apice obtusula Anfr 7 angusti, sensim accrescentes superiores carina una supramediana muniti, ultimus ad peripheriam acute bicarinatus, subtus tumidus Apertura subverticulis, angulato lunaris, perist rectum, marginibus distantibus, columellari brevi, verticali reflexo.

"Dam maj 6. min 5, axis 4½ mm'

Hab India Shevroy and Kolamulie Hills

Is stated to differ from P monomema, Benson, in the rounded base and less elevated spire.

25 Philalanka subbilirata, Godwin-Austen

Sitala subbilirata (Nevill MS), Godwin-Austen, Moll India, 1, 1882, p 39, pl 10, fig 11, var fig 12

Nanina (Sitala) subbilirata, Tryon, Man Conch ser 2, 11, 1886, p 56, pl 25, fig 28

Original description — "Shell depressly conoid, rather openly periorate, covered with a strong epidermis; sculpture, very fine longitudinal ribbing, well seen on base, crossed by irregular lines of growth, colour dull ochraceous brown; spire flatly conoid, apex flat, whorls 5, with a fine rib on the periphery of the last whorl, with a single intermediate one above it, sides flat from the suture to this, slightly convex above, aperture orate, subscritical,

peristome rather thickened, columellar margin slightly oblique, not reflected

"Major diam 27, alt axis 1.3 mm"

Hab. Andaman Islands · Little Brother Island (Nevill), Batte Malve.

The shell shown in fig 12 of plate 10 of Moll India, from Batte Malve, was sent to Lt.-Col. Godwin-Austen by Nevill from the Indian Museum, Calcutta, as no. 206, Sagdinella didrichsenn, Morch, with a note attached, "I doubt it being this species" He found that it agrees well with typical subbilicata from Little Brother, except that the shell was not so well grown, and the apex flatter.

26. Philalanka ? liratula, Pfeiffer

Helia Inatula, Pfeiffer, P Z S 1860, p 135, ibid, Malak Blatt vii, 1860, p 234, Hanley & Theobald, Conch Ind 1875, pl. 150, figs 5, 6

Nanna (Thalassa) lu atula, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 47

Charopa (Thalassia) hi atula, Tryon, Man. Conch. ser 2, 11, 1886, p. 215, pl. 63, figs. 74, 75

Original description — "T. umbilicata, trochiformis, tenuiscula, strata et liris filiformibus subconfertis cincta, diaphana, oleosomicans, pallide corneo-lutescens, spira conica, apice obtusa, sutura impressa; anfr. 7½, convexiusculi, ultimus angulatus, non descenders, basi lævior, convexior; apertura vix obliqua, subangulato-lunaris, perist. simplex, rectum, margine columellari declivi, juxta umbilicum perangustum subdilatato

"Diam maj. 6, min 51, alt 4 mill."

Hab Ceylon (Thwartes)

Placed here provisionally with some doubt as to its systematic position

27. Philalanka homfrayi, Godwin-Austen.

Sitala homfrayı, Godwin-Austen, P Z S. 1895, p 448, fig A

Original description —"Shell dextral, pyramidal, turreted, flat on base, imperiorate, sculpture coarse transverse striation, with



Fig 2 -Philalanka homfrayı, × 12 (From P Z S)

two ribs on the periphery and fine spiral close ribbing on the apical whorls, colour horny grey, spire conic, apex blunt and papillate; suture shallow, whorls $4\frac{1}{2}$, sides angulate, a strong raised 11b on the periphery of the last whorl, and another similar

rib above it at the angulation of the whorl, above the vertical portion; aperture ovately quadrate, very oblique; peristome thin, slightly thickened; columellar margin vertical.

"Major diam 14, alt axis 1.4 mm."

Hab Andaman Islands South Andaman (Roepstorff).

Differs from P. tricarmata in the pyramidal form and smaller, narrower aperture

28 Philalanka tricarinata, Blanford.

Helia tricarinata, Blanford, J. A. S. B. xxx, 1861, p. 355, pl. i, fig. 10, Hanley & Theobald, Couch Ind 1875, pl. 129, fig. 7, 10. Sitala tricarinata, Godwin-Austen, Moil. India, 1, 1882, p. 39, pl. 10, fig. 10

Nanna (Sitala) tricarinata, Tryon, Man Conch ser 2, 11, 1886, p 55, pl 25, fig 25

Original discription.—"Testa aperte perforata, depresso turbinata, tenuis, pallide cornea, oblique striatula, subtus obsolete decussata, spira conoidea, apice planulata, perobtusa, subtus impressa. Anfr. 4 convexi, superne carinis duodus filirorinibus cincti, ultimus tribus medi inis circumdatus, non descendens, subtus rotundatus. Apertura subverticalis, rotundato-lunaris; peristoma rectum, acutum, marginibus distantibus, sinistro non reflexo

" Diam. 12, alt 1 mm"

Hab India: Nilgiri Hills, Pykara (Blanford)

A very small form, readily distinguishable by the median revolving lira being at the periphery, one being below and the other above the periphery.

29. Philalanka quinquelirata, Gude

Philalanka quinquelirata, Gude, Proc. Malac Soc London, xi, 1914, p 51, text-figure

Original description —" Shell dextral, pyramidal, narrowly perforate, pale yellowish corneous, semi-translucent, covered with a



Fig 3 -Philalanka quinquelirata (From Proc Malac Sco London)

deciduous cuticle; finely and closely striated, the strime being flexuous on the base, where there are also traces of excessively minute spirals. Spire convex, apex obtuse, suture deep. Whorls 6, turned above, inflated below, increasing slowly and regularly, with five fine spiral lirm, one at the periphery, the other four between it and the suture, the last whorl not descending in

front. Aperture nearly vertical, semilunate; peristome thin, the lower margin slightly, the columellar margin strongly reflected and partly overhanging the narrow perforation" (Gude)

Diam. 5 25. alt 4.25 mm.

Hab India .. Anamullay Hills (Beddome).

Five specimens—labelled tricarinata, Blanford—received by Mr. Ponsonby from the late Col. Beddome, proved upon examination to be quite distinct, and to differ, in fact. from all other known forms. My own collection contains two specimens from the same source

Philalanka guinqueli ata is much larger than P. tricarinata which measures less than 2 mm and possesses, moreover, only three revolving hire, the lowest of which is below the periphery, whereas in the present species it is peripheral. The perforation of P. tricarinata is proportionately wider and the columellar margin is not reflected, while the aperture is higher in proportion to its width than is the case in P. quinquelirata

30 Philalanka? lamcabensis, Jousseaume

Plectopylis lancabensis, Jousseaume, Mém Soc. Zool France, vii, 1894, p 278, pl 4, fig 8 Plectopylis? lamcabensis, Gude, Science Gossip, x & v. 1898. p 171. fig. 91 (copied from Jousseaume)

"Shell subperforate, trochiform, stout, somewhat thin, striated and surrounded on the last whorl by three thread-like ridges.

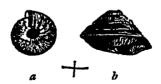


Fig 4 — Philalanka? lamcabensis (after Jousseaume)

diaphanous, shining, corneous white, apex obtuse, suture impressed, crenulate; whorls 71, flattened, the last angulate, not descending; base more convex, radiately striate; aperture scarcely oblique, subangulate, lunate; peristome simple, straight, columellar margin sloping, near the umbilicus narrowly dilated.

"Diam. 4, alt 3 mill"
Hab. Ceylon · Nuwara Eliya (Simon)

Described as a species of Plectopylis, the absence of any mention of internal folds or denticles makes the generic reference extremely questionable. Mr Sykes doubtfully suggests (Proc. Malac Soc London, in, 1898, p 71) that it belongs to the genus Sitala; this I consider improbable. The aspect of the shell, especially the excavated umbilical region, would rather suggest the genus Philalanka

31 Philalanka secessa, Godwin-Austen

Philalanka secessa, Godwin-Austen, Proc Malac Soc London, iii, 1898, p 11, pl 1, fig 1 (shell), fig 2 (animal), figs 3-5 (anatomy), ibid, Moll India, ii, 1907, p 191

Original description — "Shell pyramidal, base convex, narrowly umbilicated Sculpture: fine, irregular, costulate transverse lines; a single lirate band follows the angulation of the whorl throughout, with another on and above the suture; on the underside an exceedingly fine striation may be seen under a high power (×60) Golour pale ochraceous, with a greenish tinge. Spire conic, sides nearly flat; apex blunt Suture shallow, with a thread-like liration. Whorls 8, narrow, sides very slightly convex below the liration, flat from that to the suture Aperture semilunate, narrow, vertical Peristome thin, slightly reflected on the columellar side, which is suboblique

"Maj diam 7, alt axis 6 mm" (Godwin-Austen)

Hab Cevlon: Ambegamua (Collett)

32 Philalanka daghoba, Blanford

Helia dighoba, Blanford, J A S B xxx, 1861, p 356, pl 2, fig 2, Hanley & Theobald, Conch Ind 1875, pl 150, fig 10

Patula (Actinaria) daghoba, Pfeiffer & Clessin, Nomenci Helic Viv

1881, p 99

Helix (Patula (Actinaria)) daghoba, Try.n, Man Couch ser 2, iii, 1887, p 69, pl 13, fig 60

Sesara daghoba, Gude, Journ Malac vii, 1900, p 142

Original description — "Testa anguste perforata, depresse conoidea, oblique striata spiraliter sulcata, carinata, suturæ impressæ. Anfr 7-8 lente accresceates subconvexi, ultimus non descendens, valde carinatus, infra convexus, lævis, ad umbilicum vix impressus Apertura subrecta, depressa securiformis Peristoma acutum ad umbilicum reflexum, intus 2 dentibus palatalibus munitum.

'Diam. maj 6, miu. 53, alt. 3 mm; apert alt. 1.6 mm"

(Blanford)

Hab South India: Patchamullay and Kalryenmullay Hills

(Faote)

The shell is stated by Blanford to be nearly allied to *H. retifera*, Pfr., but to be distinguished from that species by its minute umbilities and by the form, number, and position of the internal teeth, which in *H. daghoba* are small and compressed, but not lainelliform, and are situated very near the edge of the peristome. The absence of parietal lamellæ, however, indicates that the affinity of the present species must be looked for among such forms as secessa, G.-A, and bibirata, Blanf., rather than retifera, Pfr. The position of the teeth near the peristome induced the present writer in 1900 to include the species in Sesara, but the late W.T. Blanford, in a letter dated Sept. 23rd, 1900, pointed out that daghoba, together with pirrieana and bidenticulata, might belong to Philalanka, and as Lt.-Col Godwin-Austen is of the same opinion as regards daghoba, I have included it here

Unfortunately I have been unable to find Blanford's type-specimen and the shells I have seen, purporting to represent the species, have the palatal teeth much further back, so that I entertain doubts as to their identity.

33. Philalanka pirricana, Pfeiffer.

Helix puricana, Pfeiffer, P Z S 1854, p 55, Reeve, Conch Icon vn. 1854, pl 191, fig 1341, Hanley & Theobald, Conch Ind 1870, pl 87, figs. 5, 6 Helia (Actinavia) pirricana, Pfeisser, Malak Blatt 11, 1856, p 128 Helia (Laoma) pirvicana, Tryon, Man Conch ser 2, 111, 1887, p 68, pl. 13, fig 58 Sesara pirricana, Gude, Journ Malac vii, 1900, p. 142

Original description :- "T perforata, globoso-conica, tenuis, lævigata (sub lente vix striatula), pellucida, cornea, spira convexoconica, acutiuscula; sutura impressa, marginata, anfr. 7-8 convexiusculi, angustissimi, ultimus carinatus, non descendens, basi convexus, intus ter bidenticulatus denticulis subæqualibus, extus pellucentibus; apeitura vix obliqua, depressa, angulato-lunaris, denticulorum pare antico coarctata, perist simplex, rectum, margine columellari ad perforationem apertam dilatato, reflexo.

"Diam maj. 5, min. $4\frac{1}{2}$, alt. 4 mill" (Pferffer)

Hab India Walaghat, Koondah Mts, near Calicut (Pirrie)

An examination of the type has convinced me that the late W. T. Blanford was perfectly justified in his surmise, as recorded under P dughoba, that this species should be also referred to Philalanka.

34 Philalanka bidenticulata, Benson

Helix bidenticulata, Benson, A M N. H ser 2, ix, 1852, p 405, Reeve, Conch Icon vn, 1853, pl 174, fig 1184, Hanley & Theobald, Conch Ind 1870, pl 60, fig 6 Hehr (Actina ia) bidenticulata, Pfeisser, Malak Blatt ii, 1856, p 128 Helia (Laoma) bidenticulata, Tryon, Man Conch ser 2, in, 1887, p 69, pl 13, fig 59 Sesara bidenticulata, Gude, Journ Malac vii, 1900, p 142

Original description —"Testa perforata, depresso-conica, obsolete radiato-striata, albida (decorticata); spira subconica, apice obtuso, sutura impressa anfractibus 6, arcte convoluti, convexis, omnibus superne lineis duabus æquidistantibus, elevatiusculis instructi, ultimo carinato, subtus convexo; apertura aicte securiformi, verticali; peristomatis margine superiori brevissimo, columellari oblique descendente, expanso, superne reflexo, basali arcuato, dentibus duobus minutis distantibus, submarginalibus, dextro prominentiore, munito; perforatione pervia

"Diam maj 3, min. 22, nxis 21 mill" (Benson)
Hab. India Nilgiris (Jerdon)

Cf. remarks under P. daghoba, ante p. 19

35 Philalanka trifilosa, Pfeiffer.

Helix trifilosa, Pfeiffer, P Z S 1853, p 125
Helix (Trochomorpha) trifilosa, Pfeiffer, Malak Blatt 11, 1856, p 132

Original description — "T. perforata, depresse trochiformis, tenuis, radiato-striata, acute carinata, vix nitidula, pallide cerea; spira conoidea, apice hyalina obtusula; sutura marginata; anfr 6½, convexiusculi, arcte convoluti, superne carinis 3 filiformibus muniti, ultimus non descendens, basi convexior, nitidus, apertura verticalis, depressa, angulato-lunaris; perist rectum, acutum, marginibus remotis, supero brevissimo, basali leviter arcuato, columellari declivi, superne dilatato, reflexo

"Diam maj $5\frac{2}{3}$, min 5, alt $3\frac{1}{2}$ mill"

Ilab. Ceylon (Thwaites)

This species, described from the Cuming Collection, has never been figured Unfortunately, in spite of a diligent search for the type, Mr. E A Smith, until lately Assistant-Keeper of Zoology at the Natural History Museum, has failed to trace its whereabouts

36 Philalanka? mononema, Benson.

Helix mononema, Benson, A. M. N. H. ser 2, xn, 1853, p 92, Reeve, Conch. Icon. vii, 1854, pl 191, fig. 1339, Hanley & Theobald, Conch. Ind. 1874, pl. 87, figs. 2 & 3

Helix (Trochomorpha) mononema, Pfeiffer, Malak. Blätt 11, 1856,

p 132

Nanna (Microcystis) mononema, Nevill, Hand List, i, 1876, p 41 Stala mononema, Godwin-Austen, Moll India, 1, 1882, p 41, pl 9, fig 6, Tryon, Man. Conch ser 2, 11, 1886, p 57 (monomena, err. typ), pl 25, hg 33

Philainha mononema, Godwin-Austen, Proc Malac Soc. London, 111, 1898, p 12

Original description.—"T angustissime perforata, trochiforinis, radiato-striatula, corneo-albida, parum nitida, translucens; spira conica, apice acutiusculo; sutura distincta, anfr. 6½-7 sub-æquales, superne convexiusculi, filo unico elevato, tenui, mediano cincti, ultimus acute filoso-carinatus, subtus subplanulatus; apertura verticalis, depresse securiformis; perist rectum, acutum, marginibus distantibus, columellari brevi, verticali, reflexo, perforationem subtegente

"Diam maj 5, min $4\frac{1}{2}$, alt $4\frac{1}{2}$ mill" (Benson) Hab Ceylon: Heneratgodde (Layard); Balapiti (Nevill)

Resembles P. sccessa in shape, but is somewhat smaller and with a more convex spire. The figure given of the species by Godwin-Austen differs considerably from that of Reeve, but is more like the one in Conch. Ind

37. Philalanka bolampattiensis, Godwin-Austen.

Philalanka bolampattiensis, Godwin-Austen, Proc Malac Soc. London, in, 1898, p 13, pl 1, fig 6

Original description—"Shell depressedly conoid, rounded and widely umbilicated below, keeled. Sculpture. a single liration is situated about one-third the breadth of the whorl on the upper side, following the sutural thread, which commences on the keel; fine vertical irregular lines of growth—Colour pale horny—Spire depressedly pyramidal, sides flattened, apex flatly rounded—Suture well marked. Whorls 6, convex below the liration, flat above it Aperture narrow, semilunate—Peristome somewhat thickened, columellar margin reflected and very oblique

"Maj diam 5, alt axis 2.6 mm" (Godwin-Austen)

Hab. India Bolampatti Hills (Beddome)

While possessing the principal characteristics of the type species from Ceylon it has a more depressed form, agreeing in this respect with the other Cingalese species subsequently referred to the genus

38 Philalanka febrilis, Blanford

Helir februles, Blanford, J A S B xxx, 1861, p 357, pl 2, fig 4, Hanley & Theobald, Conch Ind 1875, pl 129, fig 4.

Sitala februles, Godwin-Austen, Moll India, i, 1882 p 38

Nanna (Sitala) februles, Tryon, Man Conch ser 2, n, 1886, p 55, pl 25, fig 24

Original description.— Testa angustissime perforata, globosoturbinata, spiraliter lirata Spira subelevata, convexa, apice obtusa. Suturis valde impressis. Anfr. 4½ convexi, ultimus non descendens, ad peripheriam subdepressus infra planate rotundatus, lævis Apertura obliqua, oblonga. Peristoma rectum, acutum, ad basin expansiusculum, marginibus remotis, columellari breviter reflexo.

"Diam maj 15, min. 1.3, alt 125 mm, apert. alt 06 mm (Blanford)

Hab India: Kalryenmullay Hills (Foote)

This species is stated to bear a general resemblance to tricarmata, but to be readily distinguishable by its higher spire, the absence of the characteristic triple carination, and the flatness of its basal surface.

39. Philalanka tertiana, Blanford

Hehx tertianu, Blanford, J. A. S. B. xxx, 1861, p. 355, pl. 1, fig. 11; Hanley & Theobald, Conch. Ind. 1870, pl. 16, fig. 10. Sitala **Tertiana*, Godwin-Austen, Moll. India, i, 1882, p. 40, pl. 9, fig. 9. Nanna (Sitala) tertiana, Tryon, Man. Conch. ser. 2, ii, 1886, p. 56, pl. 25, fig. 29.

Original description .- "Testa perforata, depresse turbinata,

tenuis, pallide cornea, striatula: spira conoidea, apice obtusa. Anfr 6 angusti, convexi, ultimus haud descensutura impressa dens. subtus rotundatus Apertura subverticalis, rotundato lunaris. peristoma simplex, marginibus distantibus, columellari reflexiusculo

"Diam may 21, min 21, alt 13 mm" (Blanford) Hab India. Nilgiri Hills, Pykara and Neddiwuttom

40 Philalanka thwaitesi. Pfeiffer.

Helix thicaitesi, Pfeiffer, P Z S 1853, p 125; Reeve, Conch Icon vn, 1854, pl 191, fig 1336, Hanley & Theobald, Conch. Ind 1875, pl 128, figs 7-10

Helix (Microcystis) thwaitesi. Pfeiffer, Malak Blatt 11, 1856.

p 123

Nanna (Microcystis) thuraitesi, Tryon, Man Conch ser. 2, 11, 1886. p 118, pl 39, fig 5

Mici ocystis nucara, Jousseaume, Mém Soc Zool France, vii, 1894.

p 273

Philalanka thwaitesi, Godwin-Austen, Moll India, 11, 1907, p. 193, pl 112, fig 1 (taw & radula)

Original description - "T. aperte perforata, convexo-depressa, striatula nitida, cereo-hyalina, spira breviter conoidea, obtusula, sutura profunda, submarginata, anfr. 63 convexi, arcte convoluti. ultimus non descendens, basi inflatus, apertura verticalis, lunaris, perist rectum, acutum, margine columellari arcuatim oblique descendente, ad perforationem vix dilatato

"Diam may 5, min 43, alt 3 mill" (Pfeiffer.)

Hab. Ceylon (Thwartes), Nuwara-Eliya (Simon); Ambagamuwa (Collett)

Under a strong lens the shell is seen to be densely covered with spiral strike Mr. E R Sykes established the fact (Proc Malac. Soc London, 111, 1898, p. 65) that Microcystis nuwara, Jousseaume, and the present species are identical Jousseaume, in fact, based his species upon the figure of thwaiten in Conch Icon, which was drawn from Pfeiffer's type

Lt-Col Godwin-Austen investigated the anatomy and describes

the genitalia, but he gives no figures

Var suavis. Jousseaume

Microcystis suavis, Jousseaume, Mém Soc Zool France, vu, 1894, p 273, pl 4, fig 3, Collett, J A. S B Ceylon Branch, xv, 1897 (1898), p 12

Microcystis thwaitest, var suavis, Sykes, Proc Malac Soc London, ın, 1898, p. 65.

Differs from the typical form in having a slightly more depressed spire, a somewhat larger umbilicus, and in the mouth being somewhat different in shape.

Hab Ceylon Nuwara Eliya (Simon); Ambagamuwa (Collett)

41 Philalanka depressa, Preston

Microcustus thwaitesi, var depressa, Preston, Rec. Ind. Mus 111, 1909, p 135, pl 22, fig 6

Shell depressed-conoid, almost lenticular, pale corneous, translucent, shining, very finely striated and with excessively minute spirals, spire much depressed, suture deep Whorls 4½, strongly convex, closely wound Aperture vertical, reniform, peristome acute, upper margin ascending at first, outer and basal evenly arcuite, columellar slightly dilated, vertical

Diam 35, alt 2 min.

Hab. Cevlon Uda Pussellawa (Preston).

Mr Preston considers this form a variety of thwatesi, stating that, except in the depressed spire, it appears to be normal. The figure certainly bears out this view, but it must have been very badly drawn. A specimen, received by me from the author, differs from thwatesi in several important respects, and the foregoing description has been drawn up from it. The shell is much more depressed being almost lenticular, the whoils are much more convex above, the umbilicus is much wider, distinctly showing all the whorls; on the other hand, the region round the umbilicus is not excavated as in thwatesi, and the mouth is also different, being reniform, not lunate. The whole shell has, in fact, a totally different aspect, and I have no hesitation in according it specific rank.

42. Philalanka circumsculpta; Sykes.

Microcystis thwaitesi (non Pfeisser), Jousseaume, Mém Soc Zool France, vii, 1894, p 272 Muci ochlamis percumsculpta, Sykes, Proc Malac Soc London, ii, 1897, p 235, pl 16, figs 3 & 4 op cit iii, 1898, p 65 Philalanka en cumsculpta, Godwin-Austen, Moll Ind ii, 1907, p 194

Original description —" Testa perforata, convexo - depressa, nitida, cereo-hyalina; spira brevitei conoidea, apice obtusa, sutura impressa, anfr. 5, convexi, arte convoluti, obsolete spiraliter lirati, ultimus non descendens, basi inflatus; apertura lunaris, peristoma rectum, acutum, margine columellari ad perforationem dilatato, subreflexo

"Diam max 5, min 47 mm; alt 3 mm" (Sykes)

Hab. Ceylon Watawala (Collett); Nuwara-Eliya (Simon)

"This species is nearly related to the Helix thwaitest of Pfeisfer (which is also obsoletely spirally lirate), but may be at once distinguished by the fact that its breadth is greater in proportion to the number of whorls. The umbilicus is also slightly smaller in the present species, the spire is not so much raised in proportion, and the nucleus is larger. The sculpture is stronger than in H. thwaitest, and a few of the stronger lines of growth intersect the revolving liræ, thus giving the shell a decussated appearance under a lens"

Lt-Col. Godwin-Austen examined the animal of a specimen received from Mr. Collett. He discovered two embryonic shells inside it, thus establishing the fact that the species is ove-viviparous, a feature which it probably shares with other species of the genus

43. Philalanka? sinhila, Godwin-Austen

Lamprocystis? sinhila, Godwin-Austen, Proc Malac Soc. London, 11, 1897, p 178, pl 14, fig 2

Original description :—" Shell globose, solid for its size, scarcely umbilicated; sculpture smooth, with a strong periostracum, colour? (bleached) Spire low, depressedly conic, apex very blunt, suture shallow; whorls 5, closely wound, regularly increasing Aperture narrowly lunate, vertical, peristome simple; columellar margin suboblique

"Maj dum. 36; alt axis 1 mm" (Godwin-Austen)
Hab. Ceylon Uda Pussellawa, Watawala (Preston)

A specimen received from Mr. Preston enables me to supplement the foregoing description in one respect, namely, as regards colour, which is pale corneous. It also shows distinct microscopic spirals, and agrees therefore with the other members of this group, a fact which induces me to include it here.

Genus RUTHVENIA. Gude.

Austema, Gude, Science Gossip, A 8 111 1897, p 390, not Austema, Nevill (1878)

Sykesia, Gude, tom cit. p. 332, ibid vi, 1899, p 149, not Sykesia, Pomel (1883), Godwin-Austen, Moll India, ii, 1907, p 196
Ruthvenia, Gude, Proc Malac Soc London, ix, 1911, p 271

Dextral, shell translucent, with straight acute edges, acutely keeled, with one or more fringed spiral line. Parietal and palatul armature present

TYPE, Helix clathratula, Pfeiffer.

Range Southern India and Ceylon

Key to the Species

A. One transverse parietai plate

a Notched about the middle, a short support postemorly above Habitat, Ceylon.

a Umbilicus wide, ribs and liræ prominent . clathratula β Umbilicus narrower, ribs and liræ obsolete . v compressa.

b Not notched

clathratuloides

β Sinuous, with a short supportanteriorly above, umbilicus still narrower. Habitat, India

retifera

B Two transverse parietal plates

a Shell flattened, no fold below umbilical augulation, umbilicus still narrowei Habitat, Cevlon

A Shell conoid, with a double fringe of curved hairs, a horizontal fold below umbilical angulation, umbilicus still nariower Narrowest of all Habitat, Ceylon

caliginosa

biciliata

44 Ruthvenia retifera, Pfeiffer

Helia retifera, Pfeiffer, P Z S 1845, p 73, Reeve, Conch Icon vii, 1853, pl 173, fig 1170, Hanley & Theobald, Conch Ind 1871, pl 87, figs 8 & 9

Helix (Plectopylis ?) retifera, Nevill, Hand List 1, 1878, p 70

Helix (Plectopylis) retifera, Tryon, Man Conch ser 2, in, 1887,

p 161, pl 34, figs 63, 64

Plectopylis relifera, Pilsbry, Man Conch ser 2, 12, 1894, p 146.

Gude, Science Gossip, x s 111, 1897, p 301, fig 43 (shell and armature)

Plectopylis (Sykesia) retifera, Gude, Science Gossip, n s vi, 1899 p 149

Original description — "T. umbilicata, obtuse trochiformis, striato-plicatula, lineis nonnullis concentricis elevatis reticulata, carinata, diaphana, sericina, pallide cornea, spira elevata, obtusa. anfr 6½ planiusculi, ultimus basi subplanus, striatus, umbilicus mediocris, pervius; apertura depressa, securiformis; perist simplex, acutum, margine s ipero bievi, basali plane arcuato

simplex, acutum, margine s ipero bievi, basali plane arcuato
"Diam. maj. 7, min 63, alt 4 mill" (Pfeiffer.)

Hab. India Nilgiris (Metcalf, Jerdon), Koonoor Ghat (Blanford, Nevill), Tinnevelly Hills (Beddome) Shevroy Hills (Blanford),

Mysore (Parry)



Fig 5 -Ruthventa retifera

The parietal armature consists of a single, strong, vertical plate, slightly sinuate, but not notched, giving off a slight support anteriorly a little below the upper extremity (see fig. 5 c, which shows both the parietal and palatal armatures from the posterior side). The palatal armature—as in all the members of the group—is distinctly visible through the shell-wall, and consists of two series of denticles, the upper series being composed of posteriorly, a strong, short, vertical flattened tooth, and, anteriorly, a minute, horizontally elongated denticle, in a line with the base of the posterior tooth; the lower series is composed of posteriorly, a smaller, flattened, vertical tooth, and

anteriorly, in a line with its upper extremity, a minute, houzontally elongated denticle, and, in a line with its base, a larger denticle, clongated obliquely Above the periphery occurs, in addition, a small, horizontal denticle, and below the umbilical angulation a short horizontal fold. The two specimens figured are in Mr. Ponsonby's collection That shown in fig 5 b is not quite mature, the newly-formed palatal armature consisting of only one horizontal and two vertical denticles The late Col Beddome's collection contains a large series of this species from the Tinnevelly Hills, of these, nine full-grown specimens possess only one set of denticles; five not quite full-grown specimens are each provided with two sets of denticles, the older being complete, while the newly-formed sets consist of one, two. or three denticles, four immature specimens have only one set of denticles; ten other immature shells possess each two sets of denticles Of the latter, three have the older set complete and the newer set partly formed, five have the older set incomplete (partly absorbed) and the new set complete; while, finally, the two remaining specimens have both sets complete. It may, therefore, he safely inferred that the older set does not become absorbed until the new set is completed In a few instauces I have observed that the two lower anterior denticles have become fused.

45 Ruthvenia clathratuloides, Gude

Plectopylis clathi atuloides, Gude, Science Gossip, A. S. III, 1897, p. 332, fig. 44

Plectopylis (Sylesia) clathratuloides, Gude, op. cit. vi, 1899, p. 149

Sylesia clathi atuloides, Godwin-Austen, Moll. India, 11, 1907, p. 199

Original description —" Shell depressed conical, moderately umbilicated, pale corneous, translucent, finely and regularly plicated by raised ribs above, finely and closely ribbed and a little shining below; whorls 5½ slowly increasing, slightly convex, suture impressed Periphery with an acute compressed keel, above which revolve two raised spiral ridges, the lower provided with a fringe of coarse hairs. Aperture subquadrate; peristome simple, a little thickened. Umbilicus deep and moderately wide Parietal armature, one strong, vertical, simple plate. Palatal armature in two series, upper series with one posterior, vertical, conical tooth and one minute anterior denticle; lower series, with one posterior, vertical tooth and a small anterior denticle, in addition, one elongated horizontal fold below the umbilical angulation and a small fold above the peripheral angulation.

"Diam may 6, min 55, alt 35 mm" (Gude)

Hab India Anamullay Hills, Madura (Beddome)

The present species differs from R cluthratula
elevated, in having a narrower umbilicus, and in be
and more tumid below, while from R retifera it
elevated spire and the wider umbilicus, it is, in

ess inte between these two species. The parietal armature consists of a simple, strong, vertical plate, which is not notched, and is without supports (see fig 6 d). The palatal armature is in two series, the first (upper) series consisting of a posterior vertical

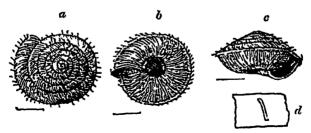


Fig 6 -Ruthvenia clathratuloides.

tooth and a minute anterior denticle; the second (lower) series being composed of a posterior vertical tooth and a small anterior denticle, below the umbilical angulation there is, besides, an elongated horizontal fold, and above the peripheral angulation a small fold (see fig. 6 b, which shows the base of the shell with the palatal armature visible through the shell-wall). The specimen figured is one of the Anamullay Hills specimens in the late Colonel Beddome's collection. Six specimens from Madura, India, also in that collection, I refer to this new form, four of these are immature and exhibit two sets of armatures, as is the case in immature specimens of R retifera.

When describing this species in 1897, I hazarded the opinion that the specimens referred to under *Plectopylis clathi atula* by Nevill (Hand List, i, 1878, p. 70) as having been collected in Sikkim by Stoliczka might pertain to my species. Lt -Col. Godwin-Austen, however, rejects this surmise and thinks that there has been some mixing of specimens. He states that he has never seen the species in undoubted Darjeeling collections, such as Blanford's and his own. I am quite prepared to admit the force of this argument, and it is, in fact, extremely improbable that a species should occur in two localities so widely separated and so different faunistically as Sikkim and the southern part of the Indian Peninsula or Ceylon

46. Ruthvenia clathratula, Pfeiffer

Helir clathratula, Pfeiffei, Zeits Malak vii, 1850, p 67, Reeve, Conch Icon vii, 1852, pl 65, fig 336, Pfeiffer, Conch Cab Heliceen, iii, 1853, p 310, pl 127, figs 17-20, Hanley & Theobald Conch Ind 1875, pl 132, figs 1-4

Conch Ind 1875, pl. 132, figs 1-4

Helix (Plectopylis) clathiatula, Nevill, Hand List, 1, 1878, p. 70;

Tryon, Man Conch ser 2, 11, 1887, p. 161, pl. 34, figs 72, 78

Plectopylis clathiatula, Jousseaume, Mém Soc Zool France, vii, 1894, p. 277

Plectopylis (Austenia) clathratida, Gude, Science Gossip, N s ni. 1897, p 300, fig 42 (shell and armature)

Plectopylis (Sylema) clathratula, Gude, op cit. vi, 1899, p. 149

Helix putcolus, Benson, A M N II ser 2, vii, 1853, p 92, Reeve,

Conch Icon vii, 1854, pl 190, fig 1334

Original description.—"T. late umbilicata, lenticularis, acute carinata, superne liris elevatis (in quovis anfractu 2) et costis distinctis clathrata, parum nitens, cornea; spira parum elevata, obtusiuscula, anfract 5 subæquales, vix convexiusculi, ultimus basi radiato-striatus, circa umbilicum subinflatus, apertura verticalis, angusta, angulato-lunaris; perist simplex, rectum, acutum

"Diam. maj 54, min 5, alt 23 mill" (Pfeiffer)

Hab. Ceylon Kandy, Balapiti, Badulla (Blanford, Layard, Newll), Ambagamuwa (Collett), Balcadua (Simon)

When first described by Pfeiffer the habitat was unknown

Benson, in 1853, described what he thought was a new species under the name of *Heliv putcolus*, from Balcadua, Ceylon Pfeiffer recorded this name as a synony m of his species (Mon Helic Viv. iv, 1859, p 116) and Benson himself subsequently pointed out the identity of the two (A M N. H ser 3, v, 1860, p 247)



Fig 7 -Ruthvenia clathratula

The parietal armature consists of a single, slightly oblique. vertical plate, which is slightly twisted and a little notched in the middle, and gives off posteriorly above an obliquely ascending support (see hg 7 d, which shows the shell with part of the The palatal armature appears to be someouter wall removed) what variable, and consists of various denticles, arranged principally in two horizontal series, midway between the periphery and the umbilious In the specimen figured, which is in Mr Ponsonby's collection, the first series consists of : posteriorly, a short, strong, flattened vertical tooth, and auteriorly, two short, slight, horizontal denticles, separated by a short space, the second series consists of . posteriorly, a short, flattened, vertical tooth, a little smaller than the one above it, and, anteriorly, a short, oblique, curved dent-cle Below these two series is a longer, but thin, horizontal fold, coincident with the umbilical angulation, while above the vertical tooth of the first series is a minute. horizontal denticle, coincident with the peripheral keel. specimen measures 5 millimetres in diameter. (Fig 7 a shows both armatures from the posterior side, the anterior palatal denticles being hidden by the posterior teeth, fig 7 b gives the anterior view of both armatures, but the posterior tooth of the first series is here hidden by the parietal plate; fig 7 c shows

the palatal folds as they appear from below the shell-wall; all the figures are enlarged) Two specimens in my collection—measuring, major diameter 6 millimetres, minor diameter 55, axis 3 millimetres—have the anterior portion of the first series consisting of four horizontal denticles, the first two close together, the third a little smaller and further distant, and the fourth still smaller and still further distant, the anterior portion of the second series possesses, in addition to the oblique curved denticle, a slight straight, horizontal denticle—Another specimen, also in my collection, measuring 55 millimetres in diameter, has three horizontal denticles in the first series, while the second series is similar to that in my other two specimens. It possesses, however, in addition, one posterior and two anterior denticles of a previous set, separated from the mature set by a distance of 1 millimetre

Var. compressa, Sylces

Plectopylis (Sylesia) claths atula, vai compressa, Syles, Proc Malac Soc London, in, 1898, p 72, pl 5, figs 13, 14, Gude, Science Gossip, N 8 vi, 1899, p 75, fig. 101

Differs from the type in being more elevated, in the more convex spire and the narrower umbilicus, while the raised ribs arc scarcely visible. The armature is similar to that of the type



Fig 8 -Ruthventa clathratula var compressa

The specimen figured is in Mr Ponsonby's collection; it measures 5 millimetres in diameter, altitude 2.5 millimetres

Hab Ceylon · Ambagamuwa (Collett)

47 Ruthvenra caliginosa, Sykes

Plectopylis (Sykesia) caliginosa, Sykes, Pioc. Malac Soc London iii, 1898, p 72, pl 5, figs 21, 22; Gude, Science Gossip, N 8. vi 1899, p 75, fig 100 (shell and armature)

Original description — Testa mediocriter umbilicata, lenticularis, acute carinata, superne costulis obscuris remotis ornata, parum intens, corneo-brunnea, apice magno, obtuso; sutura bene impressa; anfr. 5, plano-convexi, lente accrescentes, ultimus basi inflatus, radiato-striatus, apertura verticalis, angusta, angulato-lunaris, peristoma simplex, acutum; plica et dentes sicut (?) in P. clathratula, sed dentes palatales pauci.

"Alt. 29, dram. 6 mm " (Sykes)
Hab Ceylon. Ambagamuwa (O. Collett).

"Shell slightly more elevated than P. clathratula, whorls a little flatter, base more inflated, the umbilicus being little more than

half the size, colour more brown; the spiral lira are absent, save for a faint trace above the suture of a single one, and the coste almost obsolete; the armature appears to be very similar, save that the palatal denticles are only three or four in number" (Sukes)

The parietal armature consists of two simple, subvertical plates which are somewhat thickened and truncate at the lower, and attenuated at the upper extremities, these plates are separated by a distance of a quarter of a whorl, and the posterior one is the stronger (see fig 9 d, which shows the parietal wall with its two plates)

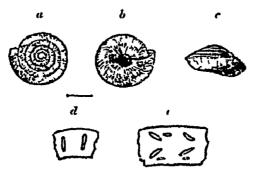


Fig 9 - Ruthrenna califonosa

The palatal armature is in two vertical series—the anterior series consists of an obliquely ascending short quadrate tooth near the periphery, and below this an obliquely descending lamelliform tooth, with a slight, horizontally clongated denticle below its posterior extremity, the posterior series is similar to the anterior one, but the teeth are stronger and thicker in the former, while there is in addition a horizontally elongated denticle on the anterior side of the upper tooth. The specimen shown in fig 9 a-c measures 6 millimetres in diameter, alt. 3 millimetres, and is in the collection of Mr Ponsonby. The armstures are figured from the type-specimen in the collection of Mr Sykes, who kindly permitted me to open the shell for the examination of the armature

48 Ruthvenia biciliata, Pfoiso.

Helix biciliata, Pfeisser, P Z S 1855, p 112, Hanley & Theobald, Conch. Ind 1875, pl 159, figs 1 & 4

Nanna (Hemiplecta) biciliata. Pfeisfer, Malak Blatt 11, 1856, p 121

Macrochlamys biciliata, Pfeisier & Clessin, Nomencl Helic Viv

1881, p 45
Nanna (Kaheila) bicihata, Tryon, Man Conch ser 2, n, 1886, p 67, pl 28, figs 7 & 8

Plectopylis (Sylesia) bicilata, Sykes, Proc Malac Soc London, in. 1898, pp 66 & 160, Gude, Science Gossip, N s vi, 1899, p 16, fig 99 (shell and ermature).

Sykesia biciliata, Godwin-Austen, Moll India, 11, 1907, p 196, pl 112, fig. 3 (anatomy)

Original description — "T. perforata, convexo-lenticularis, tenuis, pellucida, cornea, oblique plicata, bicarinata carinis pliis longis ciliatis; spira parum elevata, vertici subtili; anfr 45 scalares, ultimus antice non descendens, basi vix convexus, apertura subobliqui, depresse securiformis, perist simplex rectum, marginibus subparallelis, columellari vix reflexiusculo

"Diam. maj. 71. min. 61, alt 31 mill" (Pfeiffer)

Hab Ceylon (Skinner), Haputale (Collett), Patapolla (Preston). The systematic position of this species remained uncertain for a long time, the shell having been referred by various authors to such different genera as Hemiplecta, Macrochlamys, and Kaliella In 1898, Mr. Sykes, in identifying some shells-collected by Mr. Preston in Ceylon-ns Helix biciliata, referred the species to Sylena, a section of Plectopylis proposed by me in 1897 for the reception of Helix clathratula and H. retifera When classifting all the known species of Plectopylis in 1899, I stated that when the anatomy of the forms referred to this section should come to be investigated, they would probably be found to differ so widely from typical Plectopylis that the section would rank as a separate This has since been demonstrated to be the case by Lt.-Col Godwin-Austen, who has examined the animal of bigliata. and has found, moreover, that it has close affinity with the genus Thysanora, placed, with some doubt, under Eulota by Prof Pilsbry, but which appears to pertain to the Endodontida

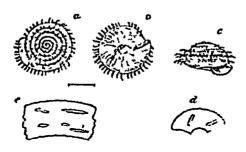


Fig 10 -Ruthvenia biciliata

The parietal armature consists of two simple obliquely accending folds, separated by a distance of half a whorl, having the upper extremities somewhat attenuated and the lower truncate (see fig 10 d, which shows the parietal wall with its two folds). The palatal armature is composed of first, a short, horizontal fold below the periphery, a little further back but in a line with it a strong lamelliform denticle, ascending obliquely; secondly, three denticles in a line horizontally and about equidistant, the posterior one strongest; thirdly, a short slight horizontal told near the lower suture, rising near the aperture and revolving as far as the second denticle (cf. fig 10 c, which shows the inside of the outer

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wall with the palatal armature) The shell shown in figs $10 \, a$ -c is one collected by the late O. Collett, and is in Mr. Ponsonby's collection, while the armatures exhibited in figs. $10 \, d$ and c are drawn from a specimen brought home by Mr. Preston and which is in Mr. Sykes's possession

Genus PUPISOMA, Stoliczka,

Pupisoma, Stoliczka, J. A. S. B. vlii, 1873, p. 32; Nevill, Hand List, 1, 1878, p. 192; von Möllendorff, Nachr Blatt., D. Malak. Ges. xx, 1888, p. 103, ibid., Ber. Senck. naturf. Ges. 1890, p. 223, Pilsbry, Man. Conch. ser. 2, ix, 1894, p. 52, Godwin-Austen, Land. and Freshw. Moll. India, ii, 1910, p. 300 (jaw and radula)

"Shell minute, thin, brown, perforated; varying from pupiform, almost cylindrical, to globose-conoidal; apex obtuse, whorls rounded, with delicate, irregular, cuticular riblets. Aperture oblique, truncate-oval or rounded, the lip thin, simple or a little expanded, broadly dilated at the columella, nearly closing the umbilical perforation, the columellar edge sometimes slightly projecting, but hardly dentate." (Pilsbry.)

"The animals have very short pedicles and barely a trace of

tentacles They generally live on wood" (Stoliczka.)

Genitalia unknown

"Radula exceedingly small; formula (P. miccyla).

"The centre tooth is smaller than those on either side, it is tricuspid, the main point long, those on the side basal and wide apart. The admedian teeth are also tricuspid with indication on the fourth and fifth of two cusps on the outer side. The laterals are on long narrow plates, with four teeth alternately long and short. The jaw is composed of about eighteen vertical plates, not overlapping each other, each plate being separated by a very narrow clear space. The cutting-edge is sharply defined. Under the highest power it seemed apparent that these plates divided at the base and merged gradually into muscular tissue." (Godinia-Austen.)

Type, Pupa lignicola, Stoliczka.

Range India, Ceylon, Borneo, Philippines, Japan, S Africa Stoliczka regarded the group as a subgenus of Pupa, while von Möllendorff, in 1888, raised it to generic rank, provisionally placing it between Buliminus and Pupa but two years later be referred it to the Fruiticcola series in proximity to Acanthinula and Zoogenites Pilsbry, not without some doubt, considered it a subgenus, a modification of Pyramidula, comparable to the American group Ptychopatula. He did not, however, include it in his synopsis of families, etc. (vide Index to the Helices, 1895,

p 122). Godwin-Austen, finally, again raised it to generic rank in the Endodontide He added descriptions of two new species. the radula of one being figured as well as the raw and radula of P. miccula The latter he found so similar to those parts of Philalanka thwaitest that he was led to place Punisoma in the same subfamily'Thysanotina, next to Philalanka. With regard to the animal of Pupisoma miccula, he further states that the foot is short and too small to see any details of its anatomy, but that upon the minute animal being pressed out between covering-glasses, the eyes were found to be conspicuous, connected with a short dark streak representing the retractor muscle. He is of opinion that in life they probably merely reach the surface of the integument Nearly every animal examined contained three embryonic shells, some in an advanced stage of development, showing the apex of the shell, and being very large compared with the parent anımal

Mr. Burnup also records its ovoviviparous character, many of the specimens of *P orcula* and *P. japonicum*, taken in South Africa, being found to contain one young molluse furnished with a shell, and some few containing two, one much larger than the

The-presence of the genus in such widely separated localities as Japan and South Africa-even so far inland as Rhodesia- is very remarkable. I am inclined to think, however, that this cannot be its natural range but that these two species-orcula and japonicum-owe their distribution to the agency of man, having probably been carried with plants, for Mr. Burnup states that they are found not only on the trunks, branches, and leaves of native shrubs and trees in woods, but on orange and apple trees in orchards as well. Benson, when describing P orcula, states the shells occurred in mango-groves, but in his description of P. miccyla he mentions that it was found on the bark of an orange tree, while Lt -Col. Godwin-Austen also records the taking of a shell on an aurantiaceous plant in India (Land and Freshw. Moll India, 11, 1910, p 301), and others on orange trees in Cevlon (op cit p. 303), so that it may be presumed that these creatures do occur on cultivated plants and may thus be transported from one country to another.

49. Pupisoma lignicola, Stoliczka.

Pupa lignicola, Stoliczka, J. A. S. B. xl, 1871, p. 171, pl. 7, fig. 3. Pupa (Pupasoma) lignicola, ibid, op. cit. xlii, 1873, p. 32. Nevill, Hand List, i, 1878, p. 192, Kobelt, Illustr. Conchyl. Buch, ii, 1878, p. 281, pl. 85, iig. 43, Godwin-Austen, Land and Freshw. Moll. India, ii, 1910, p. 300. Pyramidula (Pupisoma) lignicola, Pilebry, Man. Conch. ser. 2, ix, 1894, p. 52, pl. 14, figs. 41, 42.

Original description —"Pupa testa breviter tumide-ovata, subconica, cornea, vix rimata, apice obtusa; anfractibus 41. convexiusculis, costulis modice distantibus, transversalibus, paulo

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arcuatis, nonnunquam striis tenuioribus alternantibus, tectis, ad basin convecam obsoletis; apertura subrotundata. labio tenuissimo, levi; rarissimo denticulo parvulo mediano instructo; labro externo tenui, paululum dilatato, edentulo, in anfractum penultimum vix ascendente; columella ad basin sensim expansiuscula. regionem umbilicalem tegente, torta, infra subdenticulata

"Diam maj 15, d min 12, alt 2 min." (Stoliczka)

Hab. Burma Moulmein (Stoliczka), Rangoon (Hungerford)

"The animal is grey with somewhat darker, very short pedicles and almost obsolete tentacles. The columella of the shell is at the base peculiarly expanded, flattened, somewhat twisted, producing at the lower part a small denticle. The species was found on old masonry of the Great Pagoda at Moulmein, and on the opposite bank of the river at Martaban on similar wooden structures." (Stoliczka)

Var unidentata, Godwin-Austen

Pupa lignicola, toothed variety, Stoliczka, J A S B xl, 1871, p 172, Hanley & Theobald, Conch Ind. 1876, pl 160, fig 6
Pupisoma lignicola, var unidentata, Godwin-Austen, Land & Freshw Moll India, 11, 1910, p 300

Stoliczka when describing the type states that "out of a great number of specimens only one was met with which has a small tooth about the middle of the inner or parietal lip." Hanley and Theobald in figuring the toothed variety do not mention its source but give the habitat Moulmein, so that it is probable the shell illustrated is the one recorded by Stoliczka

50 Pupisoma constrictum, Godwin-Austen.

Pupa (Pupisoma) constrictus, Godwin-Austen, P Z S 1895, p 450, fig B

Original description — "Shell turbinate, perforate; sculpture minutely costulate above, from the swollen portion forwards the surface is smoother, colour, pale ochraceous; spire come; sides flat, apex pointed; suture impressed; whorls 5, convex, at the distance of half a turn in the spiral behind the aperture there is a sharp swelling of the whorl, marking apparently the position of the previous aperture, but this is not seen in any of the whorls above, aperture ovate, oblique; peristome much thickened and reflected, united by a thin callus on the body-whorl; sinuate below and on outer margin

"Major diam. 21; alt axis 22 mm." (Godwin-Austen)
Hab Andaman Islands: Port Blair, South Andaman.

"Animal not yet seen, and it is difficult to say where this species should find generic position. I sorted out from a tube full of minute shells eight specimens of this very curious and interesting species. Its sculpture is like that of Pupisoma lignicola, Stol,

from Moulmen, and I think it better to place it near this than to create a new genus for it, which I at first intended, I think it best, however, to wait until someone else can examine the animal " (Godwin-Austen.)

It will be seen from the foregoing that Lt -Col Godwin-Austen







Fig 11.—Pupisoma construtum (From P Z 8)

had some doubts as to the generic position of the species. Since, however, in contour as well as sculpture it accords well with the other members of the group, it may be retained here until an examination of the soft parts shall prove other relationship. In his synopsis of the Indian forms, in Land and Freshw Moll India, ii, 1910, p 300, Lt.-Col Godwin-Austen does not include the present species

51. Punsoma orcula, Benson

Helix orcula, Benson, A. M. N. H. ser 2, vi, 1850, p. 251, Reeve, Conch. Icon. vii, 1853, pl. 174, fig. 1176, Pfeiffer, Conch. Cab., Helix, iii, 1854, p. 357, pl. 136, fig. 18, Hanley & Theobald, Conch. Ind. 1874, pl. 87, figs. 1, 4.

Pupa (Pupusoma) orcula, Nevill, Hand List, i, 1878, p. 192

Hyalima (Conulus) orcula, Pfeisier & Clessin, Nomenci Helic Viv. 1881, p 73

Zonites (Hyalima (Conulus)) orcula, Tryon, Man Conch ser 2, 11, 1887, p 177, pl 53, fig 67

Pyramidula (Pupisoma) orcula, Pilsbry, Man Conch ser 2, ix, 1894,

Pupusoma orcula, Godwin-Austen, Land & Freshw. Moll India, 11, 1910, p 301, Hirase, Conch Mag 111, 1909, p 26, pl 9, figs 30, 31, Burnup, Proc. Malac Soc London, x, 1912, p 45, Conolly, Ann S. Afr Mus xi, 1912, p 159

Original description.—"Testa vix perforata, conico-globosa, cornea, translucenté, scabra, oblique irregulariter costulato-structissipila, apice obtuso, anfractibus 3½ convexis, ultimo rotundato, sutuia profunda, apertura obliqua rotundata spiram vix æquante; peristomate tenui acuto, margine columellari reflexo, perforationem semitegente.

"Diam 2, axis 2 mill." (Benson.)

Hab India between Jounpore and Benares, Dinapore (Bacon), and whole route from Barrackpore, in Bengal, to borders of Sikkim

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and thence to Chuprah in Behar Lucknow and Behar (under bark of trees, Mainwaring); N.W. Bengal (Stoliczka) Japan (Hirase) S. Africa Cape, Natal, Transvaal, Rhodesia (Burnup, Conolly, and others)

I have already in the description of the genus referred to the remarkable distribution of this species and given my reasons for attributing its presence in such widely separated localities as

Japan and South Africa to the agency of man.

52 Pupisoma evezardi, Blanford.

Pupa erezards, (Blanford) Hanley & Theobald, Conch. Ind 1875, pl 101, figs 5, 6

Pupa (Pupisoma) erezardi, Nevili, Hand List, 1, 1878, p 192, Blandford, J A S B zlix, 1880, p 199

Punsoma erezardi, Godwin-Austen, Land & Freshw Moll India, ii, 1910, p 301

Original description — "Testa imperforata, vix subrimata, conoideo-ovata, tenuis, cornea, lineis elevatis irregularibus filiformibus obliquis ornata. Spira subtus subcilindracea, superne conoidea, lateribus convexis, apice obtuso, sutura impressa. Anfr. 41, convexi, regulariter crescentes, ultimus parum major, peripheria atque basi rotundatus, haud antice descendens. Apertura diagonalis, truncato-rotunda, edentula; peristoma tenue, rectum, expansinsculum, marginibus conniventibus, columellari verticali, ad basin subtorto, adnato-reflexo, regionem umbilicalem tegente.

"Long. 2%, diam. fere 2, long ap 1 mm" (Blanford)

Hab India Khandalla, between Bombay and Poona

(Evezard)

"Shell imperforate with scarcely even a trace of rimation in the umbilical region conoidly ovate, thin, horny, with raised hairlike oblique lines, rather irregularly disposed, on all the whorls Spire nearly cylindrical below, conoidal above, the sides convex, apex blunt, suture impressed. Whorls 4½, convex, increasing in size regularly, the last but little larger than the penultimate, rounded at the periphery and below, not descending in front Aperture diagonal, nearly circular, but truncated above, without teeth, peristome thin, all in one plane, slightly expanded, margins converging; columellar vertical above slightly twisted below, reflected and united to the whorl so as completely to cover the umbilicus.

"If the form represented by Hanley in the 'Conchologia Indica' be precisely the same as that described above, I am inclined to question the locality given, "Singhur" or, as Mr Theobald prefers writing it, "Synghar," presumably Singarh near Poona The original specimens were found by Col. Evezard at Karkalla, near Khandalla, at the head of the Bor-Ghat; and I suspect that Hanley's figure was taken from one of them There are two or three allied forms found in the Syhadri range

and the Nilgiris, forms that do not appear hitherto to have been described

". P. lignicola, a form very closely resembling P evezardi, but rather shorter and less ovate." (Blanford)

53. Pupisoma seriola. Benson

Ennea seriola, Blanford, J. A. S. B. A.A., 1861, p. 359 (nom. nud.)

Pupa seriola, Benson, A. M. N. H. ser. 3, xii. 1863, p. 427, Hauley

& Theobald, Conch. Ind. 1875, pl. 101, for. 8

& Theobald, Conch. Ind. 1875, pl. 101, hg 8

Pupu (Puprsoma). No. 54, n. sp., Nevill, Hand List, 1, 1878, p. 192

Pupa (Pupila) seriola, Pfeiffer & Clessin, Nomencl. Helic. Viv. 1881, p. 354

Puprsoma seriola, Godwin-Austen, Land & Freshw Moll India, ii, 1910, p 301

Original description — P testa vix perforata, ovato-oblonga, subcylindracea, oblique striatula, sericina, flavescente, cornea, spira oblonga, apice obtusiusculo, sutura impressa, anfractibus 5, superioribus convexis, ultimo convexiusculo antice vix ascendente, apertura subovata, superne angulata, dente 1 parietali mediano remotiusculo induta, peristomatis marginibus callo tenui junctis, dextro vix, columellari superne late expanso " (Benson.)

Long 2½, diam 1½ mill.

Hab India Cuttack, Orissa (Theobald), Darjeeling, Terai, and

Navade near Muddapur (Mainwaring)

The species is included here with some doubt—Benson alluded to the fact that Blanford considered it an Ennea, but he regarded it as having more affinity with Bulimus—He also stated that in one of the specimens the parietal lamina was not apparent Hanley and Theobald observe that the type having been smashed, and an imperfect photograph alone preserved, they cannot youch for the correctness of the figure—Although they do not expressly state the fact, the natural inference is that their illustration has been prepared from this photograph

54 Pupisoma miccyla, Benson

Helix miccyla, Benson, A. M. N. H. sei 3, 1, 1860, p. 384, Hanley & Theobald, Conch. Ind. 1875, pl. 129, figs. 8, 9

Hyalima (Conulus) miccyla, Pfeisser & Clessin, Nomencl Helic

Viv 1881, p 73

Zomites (Hyalima (Conulus)) miccyla, Tryon, Man Conch ser. 2, n,

1886, p 176, pl 53, fig 64
Pyramidula (Pupsoma) miccyla, Pilsbry, Man Conch ser 2, ix,
1894, p 52

Ernstra miccyla, Jousseaume, Mem. Soc Zool France, vii, 1894,

Pupsoma miccyla, Godwin-Austen, Land & Fieshw Moll India, ii, 1910, p 301, pl 132, figs 1, 1s, 1b (shell), fig 1c (teeth of radula), fig. 1d (Jaw)

Original description — "Testa imperforata, globoso-conoidea, tenui, striatula, nifidula, fusco-cornea, translucente, spira trun-

cato-conica, sutura impressa, apice obtusissimo, anfractibus 4, convexis, ultimo globoso, antice sensim descendente, apertura lunato-rotundata, obliqua, peristomate acuto, margine dextro arcuato, columellari acuto, verticali, cum basali angulum fere rectum efformante" (Benson)

Long 11, diam 1 mill

Hab Ceylon. Matelle (Layard), Watawala (Collett)

Benson recognized its affinity to P orcula, stating that P muccyla is smaller, destitute of the peculiar sculpture of that species, and distinguished by its very obtuse apex and by the formation of the columellar lip. Lt.-Col. Godwin-Austen, who received from the late O Collett a number of shells with the soft parts preserved in formalin, states that miccyla is smaller than lignicola, has a greater number of whorls, and is more attenuate than orcella, while the transverse strike of the cuticle appear to be more regular. These specimens enabled him to examine and figure the law and radula, and thus to fix the systematic position of the group

55 Papisoma cacharicum, Godwin-Austen

Pupisoma cacharica, Godwin-Austen, Land & Freshw. Moll India, 11, 1910, p 303, pl. 132, fig 4

Original description — "Shell scarcely perforate, globosely conoid, very turnid, corneous, sculpture, spiral striation, crossed by fine close thread-like ribbing, colour pale umber-brown; spire moderately high, come, apex blunt, suture open, whorls $3\frac{1}{2}$, rapidly increasing, very convex, aperture nearly circular, oblique, peristome thin, columellar margin perpendicular, reflected" (Godwin-Austen)

Major diam 1 33, alt 1.5 mill

Hab India Silchar (Wood-Mason)

The species is based on specimens sent for determination by Dr Annandale from the Indian Museum. They were accompanied by the following notes — "From the branches of a Pepul tree, in scars and other shallow cavities, opposite the Deputy Commissioner's Cutchery, Silchar, 3 4.81. Only one pair of short, thick, blunt, sausage-shaped tentacles, at the upper extremity of which the black eye-spots are placed. Animal semitransparent, grevish, milky white below, above grey; retractor muscles of tentacles very plainly visible through integument. No tail-gland."

56 Pupisoma longstanæ, Godwin-Austen

Pupisoma longstaffi, Godwin-Austen, Land & Freshw Moll-India, 11, 1910, p. 303, pl. 132, figs. 3 (shell), 3* (jaw), 3b (radula)

Original description —" Shell imperforate, very globosely conoid, sculpture, a smooth epidermis, with very fine, somewhat distant costulation, colour pale brown, spire depressed; whorls 3,

very tumid and well rounded on the periphery; aperture nearly circular; peristome thin; columellar margin thickened and slightly reflected and extending as a callus on to the last whorl" (Godwin-Austen)

Hab Ceylon Kandy (Mrs Longstaff)

"This shell is more globose than P miccyla and not so high in the spire, which tapers more rapidly. It is also costulate, as in the Pupisoma figured on plate 132, fig 2, a single specimen of which was sent to me by Mr Sykes, and cannot now be found. Mrs. Longstaff writes -"Numerous on palm, Florence Hotel Garden, Kandy Animal, body light grey, only one pair of tentacles, dark. Tail pointed"

"I was fortunate in seeing the radula in the first specimen Nothing could be seen of the genitalia.

mantle-zone was simple, with no shell-lobes.

There are not many teeth in the row, only some 15 or 16, all are large quadrate plates. The central tricuspid, the admedians and laterals bicuspid, the inner cusp long, the outer small The jaw was crumpled up, and being so minute was not well seen, but it appeared to be smooth' (Godwin-Austen.)

Genus SPHYRADIUM, Charpentier.

Sphyradsum, Charpentier, Neue Denkschr Allg Schweiz Gesells Naturw 1, 1837, 2nd art p 15 (as section of Pupa), Sterki, Nautilus, x, 1896, p 75

Paludinella, Lowe, P Z S. 1854, p. 206

Edentulina, Clessin, Deuts Excurs Moll Fauna, 1876, pp. 189, 208 (non Pfeiffer, 1856, sect Ennea)

Columella, Westerlund, Fauna Palaarct 111, 1887, p 125

Range Europe, North America, India.

Shell cylindrical, pupoid; aperture radial, peristome simple, straight, with thin margins

Anatomy unknown

"Jaw low, composed of distinct plates Radula with the teeth comparatively small, their cusps very short and small: transverse rows of teeth in edentulum varying from 116 to 127, each row containing r+21 (20). The centrals are tricuspid, the laterals all bicuspid except the last, which is a minute nodule, in the others there is no difference of laterals and marginals, but that the plates of attachment become shorter towards the margins and evanescent in the outer teeth The radula is 0 55 mill long, 0.14 wide " (Sterki)

The species constituting the group Sphyradium were for a long time regarded as pertaining to Pupa until Dr. Sterki, in 1896, from an examination of the radula and jaw of S edentulum, came to the conclusion that Sphyradium was more nearly allied to Punctum. On conchological grounds he had already previously held the opinion that it had no affinity with Pupa. He alludes

to the analogous case of "Pupa" neozelanica, Pfr, which has much the same form of shell, and was shown by Mr. Suter, a few years previously, to be a member of the Charopidæ.

56 a. Sphyradium himalayanum, Benson

Pupa himalayana (Hutton), Benson, A M N H ser 3, xii, 1863, p 428, Hanley & Theobald, Conch Ind 1875, pl 101, fig 4, Theobald, J A S B xlvii, 1878, p 146
Pupa (Sphyradnim) himalayana, Pferffer & Clessin, Nomencl Helic Viv 1881, p 352

Original description:—"P. testa rimato-perforata, ovato-oblonga, subcylindracea, oblique minutissime costulata, translucente, pallide cornea, spira oblonga, apice obtuso, sutura impressa; anfractibus 7, brevibus, convexis, ultimo antice leviter ascendente; apertura rotundato-ovata, edentata, peristomate tenui, margine expansiusculo, dextro superne leviter antice progrediente." (Benson)

Alt 2, diam 1 mill

Hab India Simla and Mussoori (Hutton), Panjal Range, Kashmir (Theobald)

Four specimens in the Theobald collection, in the British Museum, have enabled me to satisfy myself that this species is in all probability congeneric with S. edentulum

Subfamily PYRAMIDULINÆ.

Genus PYRAMIDULA, Fitzinger

Pyramidula, Fitzinger, System Verz Oesterr vork Weichth 1833, p 95, Westerlund, Fauna Palaarct., Binnenconchyl 1, 1889, p 10 (as group of Patula), Pilsbry. Man Conch ser 2, 1x, 1893, p 42, pl 40, figs 40, 46 (animal), pl 11, figs 17-28 (anatomy)

TYPE, Helix rupestris, Drap.

Range Northern Temperate Land Area

"Shell openly umplicated, varying in contour from flattened and disk-like to considal. Generally opaque, often rib-striate Unicoloured, spirally banded or flammulate Whorls subcylindrical or keeled, the apex generally smooth Aperture roundedlunate; lip simple and thin

"Animal having the sole undivided, lateral margin of the foot with a distinct border bounded by a groove, the grooves meeting above the tail. No caudal mucous pore Eye-peduncles long and slender

"Genital system lacking all accessory organs; vas deferens and retractor muscle inserted near or at the apex of the penis; duct of the spermatheca very long, hermaphrodite duct very long, but shortened by its extreme convolution.

"Jaw arcuate, its component laminæ generally compactly soldered, and indicated only by fine striæ which diverge slightly from the middle

"Radula (1) having only the mesocones developed upon central and inner lateral teeth, or (2) having the centrals tricuspid, laterals bicuspid lacking the entocones, marginal teeth similar but with short basal-plates; this being the usual form. In some species the marginal teeth are multicuspid by the splitting of their ectocones.

"The dentition as usual, shows considerable variation, even in species otherwise closely related As a general rule, the lateral teeth completely lack entocones, differing in this respect from Trachycystis and the Endodonta-Charopa series, but in the section Helicodiscus, entocones are well developed The dentition is quite unlike Trachycystis in the form of the marginal teeth

"The genus Pyramidula consists of dull-coloured ground-living snails, species of which occur over the whole northern temperate land area Its nearest relatives are Charopa, Trachycystis, and Stephanoda, genera occupying the southern temperate regions of Australasia, Africa, and South America respectively All may be regarded as the remnants of an early fauna, now replaced in the tropics, and to a large extent in temperate regions also, by higher groups of Helices The latter differ widely from these Patuloid genera in lacking parapodial grooves, in the solid, ribbed jaw, complex genital system, and other features

"In treating of the subgenus Patula it will be shown that that name is not available as a designation for the present genus as a whole. Pyramidula is the earliest name, and should be accepted. It may be objected that no diagnosis of Pyramidula was published by Fitzinger, but the same may be said of Beck's genera Let those who repudiate Beck's names cast the first stone at

Fitzinger!" (Pilsbry)

Section Pyramidula, Fitzinger, 8 str

Pyramidula, Fitzinger, op cit, p 95; Pilsbry, tom cit, p 43

Type. Helix rupestris, Drap.

Range Europe and Central Asia

"Shell minute, openly umbilicated, with pyramidal spire and Whorls tubular, obliquely striated. Aperobtuse smooth apex ture round or nearly so; lip simple

"Jaw arcuate, finely structed vertically.

"Radula having the central teeth unicuspid, the side cusps being represented by a slight sinuation Laterals bicuspid Marginals with low wide basal-plate, the inner bearing two cusps, the outer becoming multicuspid by splitting of the cusps

"This section differs from Gonyodiscus and Patulastra in having the spire conically elevated, and from the former in lacking rib-strim." (Pilsbry)

Only two species are known from the Indian Peninsula, and a doubtful one from Ceylon, these being the most southern outliers of the section.

57. Pyramidula humilis. Benson

Helis humilis (Hutton), Benson, J.A.S.B. vii, 1838, p. 217, Pfeister, Mon. Helic. viv. i, 1847, p. 106, Reeve, Couch Icon. vii, 1851, pl. 133, fig. 825, Pfeister, Conch.-Cab., Heliceen, iii, 1853, p. 322, pl. 129, fig. 28, Hanley & Theobald, Conch. Ind. 1871, pl. 61, figs. 1-6

Helir (Patula) humilis, Pfeiffer, Malak Blatt u. 1856, p 125 Nevell, Sci Res. Second Yarkand Miss 1878, Mollusca, p 18.

ibid , Hand List, 1, 1878, p 66

Valloma laumlis, Theobald, J A S B 1, 1881, p 47

Patula (Discus) humilis, Pfeiffer & Clessin, Nomencl Helic, Viv 1881, p 90

Helix (Patula (Discus)) humilis, Tryon, Man Conch ser 2, in. 1887. p 22, pl 3, hgs 1-6

Pyramidula (8 8) humilis, Palsbry, Man Conch ser 2, 1x, 1893, p 44

Original description -"Testa parrula, convexo-depressa, cornea, late et profunde umbilicata, anfractibus quinque rotundatis, ultimo subangulato, penultimo aperturam circularem vix interrumpente; peritremate acuto

"Diam 0 125 poll" [= 3 mill] (Benson)
Hab. India. Chur, near Simla (Stoliczka), Landour (Reeve); Simla (Stoliczka, Oldham); Murrer (Stoliczka); Tandiana (Theobald).

58 Pyramidula enomphalus, Blanford.

Helix enomphalus, Blanford, J. A. S. B. xxx, 1881, p. 354, Pfeiffer,

Mon Helic Vis v, 1868, p 138

Helir euomphalos, Hanloy & Theobald, Conch Ind 1875, p 52, pl 129, figs 1-3

Patula (Patulastra) enomphalus, Pfeisser & Clessin, Nomencl Helic

Viv 1881, p 87 Heli (Patula) (Punctum)) euomphalus, Tryon, Man Conch ser 2,

m, 1887, p 32, pl 7, figs 75-77
Pyramidula (s s) euomphalus, Pilsbry, Man Conch ser 2, 1x, 1893.p 44

Original description -"Testa mediocriter umbilicala, subturbinata, depressa, fulvo-cornea, tenuis, oblique striata; spira conoidea, apice obtusa, sutura valde impressa Anfr 4 rotundati, sensim accrescentes, ultimus vix descendens, subteres obliqua, rotundato lunaris; peristoma simplex, rectum, marginibus distantibus, sinistro haud reflexo Umbilicum perspectivum

"Diam maj. 2, min 13, alt. 1 mm" (Blanford) Hab India. near Pykara, Nilgiri Hills (Blanford)

"This shell in its form somewhat resembles a minute H tapeina, Bens, with more rounded whorls, deeper sutures, and a non-

expanded lip." (Blanford)

The species was not figured by Blanford, as he states that unfortunately the specimen, forwarded to him by his brother for that purpose, was crushed before it reached him. Hanley and Theobald, however, give a representation of the shell, the specimen figured probably originating from the same source.

59. Pyramidula? halyi, Jousseaume

Trichia halyi, Jousseaume, Mém Soc. Zool. France, vii, 1894, p 271, pl 4, fig 2.

Original description :—"Testa parva, late et profunde umbilicata, globoso-conica, irregulariter striatula, vix nitida, subopaca, corneo fusca, spira conoidea, apice obtusa; anfr 4 rotundati, sutura profunda separati, ultimus non descendens, superne planulatus; apertura perobliqua, subcircularis, perist. simplex, acutum, rectum, margine umbilicari non reflexo.

"Diam. et alt 15 mm" (Jousseaume)
Hab Ceylon Nuwara Eliya (Simon)

This species, referred to Trichia by Jousseaume—a genus certainly not represented within the limits of the Indian Empire—I place here not without some doubt, but no other genus appears so well fitted for its reception, and we have already two species in the Indian Peninsula, one of them in the Nilgiri Hills, and since the fauna of Ceylon shows many traces of affinity with that of Southern India, the extension of the genus to Ceylon offers no insuperable difficulties—One of Jousseaume's figures—that showing the inferior side—has been drawn by the artist as a sinistral shell, the other two figures being correctly shown as dextral

Family HELICIDÆ, Pilsbry.

Subfamily ACAVINÆ, Pilsbry.

Genus ACAVUS, Montfort.

Acavus, Montfort, Conch Syst 11, 1810, p 234, Semper, Reisen Arch Philippinen, Wiss Res 2, 111, 1870, p 99 (anatomy); Sarasin, Ergebn Naturw Forsch Ceylon, 1, 1888 (embryology), Binney, Ann N Y Acad Sci 111, 1884, p 92 (dentition), Pilsbry, Man Conch ser 2, 1x, 1894, p 153, Randles, Proc. Malac Soc. London, 1v, 1900, p 103 (anatomy)

Oligospin a, Ancey, Conch Exch 11, 1887, p 22

Acavella, Jousseaume, Mém Soc Zool France, vii, 1894, p 288

Type Helix hæmastoma, Lanné.

Range Ceylon

"Shell imperforate, globose depressed or globose trochoidal, solid, bright coloured. Whorls less than 5, rapidly increasing, the several earlier forming the nuclear or embryonic shell, which is about one-third the diameter of the adult. Last whorl deflexed in front. Aperture very oblique, the lip vividly coloured and broadly expanded, columellar margin long, obliquely descending, broadly flattened, the columellar lip aduate.

"Animal with undivided sole and no pedal grooves. lung and

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kidney very short, the latter [former?] opening at the base of the Body-lobes of the mantle present, of moderate or small size

"Jaw strong, low arcuate, entirely smooth, without median projection

"Radula having the teeth all unicuspid

"Genital system having no accessory organs Penis having terminal retractor, the interior with two longitudinal pilasters below, with a very short, imperforate papilla at their base, at the base of which the vas deferens enters. Spermatheca on a very

short duct Eggs very large, oval, hard-shelled

"The genus Acavus comprises Ceylonese Helices of large size and superb colouring. The shell is capacious, with a broad, polished lip of vivid red, lilac, or intense black hue The young shells at the time of their extrusion from the egg are bright coloured, with round periphery, and are about one-third the size of the adult The teeth are all unicuspid, but the marginals have shorter cusps than in Helicophania or Panda; and the shell differs from these groups in its broad columellar lip and brilliant colouring. They are arboreal in habit" (Pilsbry)

60 Acavus hæmastoma, Linné

Helix hæmastoma, Linne

Helix hæmastoma, Linne, Syst Nat ed. 10, 1, 1758, p 773;

Férussac, Hist Nat Moll 1821, pl 32b, figs 1, 2, 5, Wood, Index Testac 1825, pl 34, fig 127, Donovan, Natural Repos iv, 1834, pl 132, Sowerby, Conch Man 1839, fig 267, Hartmann, Gastr Schweiz, iii, 1844, pl 56, figs 1-5, Pfeiffer, Conch-Cab, Heliceen, i, 1846, p 31, pl 3, figs 1, 2, Chenu, Illustr Conch, 1 1851, Helix, pl 3, figs 18, 19, Reeve, Conch Icon vii, 1852, pl 71, fig 366, Adams, Genera, 1858, pl 77, fig 6a, Semper, Reisen Arch Philippinen, 2, iii, 1870, p 99, pl 12, figs 8-10 (anatomy), Hanley & Theobald, Conch Ind 1875, pl 127, fig 2, Kobelt, Illustr Conch Buch, 1879, pl 68, fig 10, Woodward, Man Moll ed 4, 1880, pl 12, fig 1, Tryon, Struct Conch iii 1884, p 45, pl 95, fig 75

Acavus hemastomus, Montfort, Conch Syst ii, 1810, p 235, pl 59, Jousseaume, Mém Soc Zool France, vii, 1894, p 287

Jousseaume, Mem Soc Zool France, vn, 1894, p 287

Helix (Acarus) hæmastoma, Beck, Index, 1838, p 37, Nevill, Hand List, 1, 1878, p 80, Westerlund, Vega Exp Vetensk Jakt iv, 1887, p 141

Acarus hæmastoma, Adams, Genera Moll 11, 1858, p 195, pl 77.

fig 6a

Helir (Macroon (Acums)) hæmastoma, Pilsbry, Man Conch ser 2.

v1, 1890, p 78, pl 18, figs 22-25

Acavus hæmastomus, Chenu, Man Conchyl 1, 1860, pl 34, fig 127: Pilsbry, Man Conch ser 2, 1x, 1894, p 154, pl 38, fig 1 (shell), pl 48, fig 14, pl 50, fig 3 (anatomy), Randles, Proc Malac Soc London, 1v, 1900, p 103, pl 9, figs 9, 12 (anatomy)

"Shell globose-conical, white, brown above and usually brown around the umbilicus; aperture very oblique; columella not truncated where it joins the basal lip.

"The shell is solid and opaque, with rounded periphery and conoidal spire. It is porcelaneous white, but dull, not polished wlen in a natural condition; the whole surface above the pernhery is usually of a reddish-brown hue, becoming paler of a brownish flesh-colour on the embryonic three whorls, and muk on the inner two. at and below the periphery there is a white zone which covers the base, or is limited by a brown tract upon the umbilical region, the suture is often edged by a white line The surface has rather rude but inconspicuous lines of growth, and under a strong lens is seen to be covered by a dense minute nattern of incised criss-cross scratches, the embryonic whorls have radiating subregular strix, cut by subobsolete spiral engraved Whorls nearly 5, convex, the last flattened and sloping above, a little descending in front Aperture very oblique. oblong-truncate, white inside, showing faintly the bands of outer Entire peristome broadly reflexed, of a bright pinkishred colour typically; columellar margin long, oblique, very broadly expanded and adnate to the base, flat, with a curved excavation at the place of the umbilious; parietal wall covered by a heavy callus of the same colour as the lip" (Pilsbry.)

Major diam 49, min 38 mm., alt 39 mm

Hah Ceylon (Blanford, Nevill, Collett), Galle (Simon)

Morch records the species from Coromandel (Journ Conchyl. xx, 1872, p 336), and Benson states that it occurs in the Nicobars as well as Ceylon (A M N. H ser 2, xviii, 1856, p. 97). As neither of these records has ever been confirmed, and as, moreover, the genus is believed to be confined to Ceylon, these two

reputed habitats may without hesitation be disregarded

The banding varies to some extent in this species, and, assuming the normal bands to be five, as in the Palearctic Cepeas, the most common form is represented by the following formula · (123) 05 or (123) 00; a specimen in my collection exhibits only two bands—12000—while another appears to have the five bands confluent in two series, thus: (123) (45), which is also the case with the shell figured in Conch Ind pl 127, fig 2 Lastly, a shell I received from Col. Parry shows four thin bands, 12305, the second band being a niere thread—I also possess several specimens without any bands—Analogous arrangements obtain in the var. melanotragus, specimens in my collection providing the following formulas · 1(23)00, (123)00, 1'(23)00

Var melanotragus, Born

Helia melanotragus, Born, Index, 1778, p 400, ibid, Test. Mus. Cæs Vindob 1780, p 388, Pfeiffer, Conch-Cab, Heliceen, i, 1846, p 32, pl 3, figs 4, 5, Chenu, Illustr Conchyl 1851, pl 5, fig. 2, Hanley & Theobald, Conch Ind 1875, pl 127, fig 3 Acavus melanotragus, Adams, Genera Moll 11, 1858, p 195, Jousseaume, Mém Soc Zool France, vii, 1894, p 287 Helia (Acavus) melanotragus, Nevill, Hand List, 1, 1878, p 80

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Helir (Acarus) hamastoma, var melanotragus, Nevill, J A. S B

1, 1881, p 133

Meliz (Macroon (Acamu)) hamastoma, var melanotragus, Pilsbry, Man Conch ser 2, vi, 1890, p 79, pl 18, fig. 24

Acavus hamastomus, var melanotragus, Pilsbry, Man Conch ser 2. 1x. 1804. p 154

"Peristome and a broad band across the parietal wall black: a white spot at the insertion of the columella

"This variety is nearly as abundant as the typical red-lipped

form." (Pelsbry)

The colouring of the bands is darker than usually obtains in the typical form, being a blackish brown

Hab Ceylon (Nevill, Blanford) Kandy (Simon)

Var conus. Pelsbru

Helix (Macroon (Acarus)) hamastomus, var conus, Pilsbry, Man Conch ser 2, vi, 1890, p 79, pl 16, fig 7 Acarus hamastomus, var conus, Pilsbry, Man Conch ser 2, 1x, 1894. p 154

Original description -" More elevated than the type, with which it agrees in the colour of the outside. The entire peristome, columella, and a broad band across the parietal wall are a beautiful lilac or purple colour, a rather deep excavation at the place of the umbilious

" Diam. 35, alt 36 mill" (Pilsbry)

Var concolor. Pilsbru

Helix hæmastoma, var concolor, Pilsbry, Nautilus, iv, 1890, p. 59 Acavus hæmastoma, var concolor, Pilsbry, Man Conch ser 2, vi. 1890, p 303

Original description -" Unicoloured chestnut all over, the two earlier whorls and a narrow umbilical crescent pink; lip and parietal wall red. No spiral white zones or bands Form normal" (Pilsbry)

61 Acavus fastosus. Albers

Helix fastosa, Albers, Malak Blatt 1, 1854, p 213, Pfeisfer, Novit Conch ser 1, 1, 1855, p 40, pl. 11, figs 1, 2, Pfeisfer, Mon. Helic Viv 19, 1859, p 197, Hanley & Theobald, Conch Ind. 1875, pl 127, fig 5

Helix melanotragus, Férussac, Hist Nat Moll 1821, pl 32 B, figs 2, 3, 4 (non Born)

Helir (Acarus) fastosa, Pleisser, Malak Blatt 11, 1856, p 144 Helir (Acams) fastuosa, Martens, Die Heliceen, ed 2, 1860, p 172 Hehx (Macroon (Acavus)) fastosa, Pilsbry, Man Conch ser 2, vi, 1890, p 79, pl 16, fige 5, 6

Acavus fastosus, Pilsbry, Man Conch ser 2, 1x, 1894, p 154

Original description -"T imperforata, globoso-conica, regulariter confertim striata, aibida, oblique fulvo-strigita et multifasciata, spira conica, obtusula; anfr. 4½ convexiusculi, rapide accrescentes, ultimus antice descendens, peripheria obsoletissime subangulatus; apertura diagonalis, oblique oblonga, intus alba, perist. hepaticum, marginibus callo nigio-castaneo nitido, intrante junctis, supero leviter arcuato, expanso et reflexiusculo, columellari declivi, plano, perdilatato, adnato

"Diam maj 38, min 30, alt 27 mill" (Albers.)

Nearly allied to A. hamastoma, but appears to differ in being less solid, having more convex whorls—the base being decidedly more convex, but not gibbous behind the columellar margin as in hamastoma, while the lip is reflexed but not expanded as in the latter. The numerous narrow encircling bands also distinguish it. A specimen, however, acquired by me from the H. Nevill collection, exhibits two blackish-brown zones above the periphery—one narrow, under the suture, and the other broad, separated from the first by a narrow light zone and extending to the periphery—as often observed in hamastoma. In addition there are below the periphery five more or less distinct linear bands. These zones and bands may be indicated by the following formula 1(23)3 44 55. This shell is well represented by figs. 3 and 4 on plate 32 n of Férussac's work, except that these show an additional linear band between the two dark zones.

When describing the shell, Albers gave the Malay Peninsula as habitat This was already called in question by Pfeiffer in 1855, while in 1859 he definitely indicated Ceylon as its origin

62. Acavus prosperus, Albers

Helix mospera, Albers, Malak Blatt iv, 1857, p 93, pl 1, figs 7, 8, Hanley & Theobald, Conch Ind 1876, pl 150, fig 4

Helix (Acavus) mospera, Martens, Die Heliceen, ed 2, 1860 p 172

Helix (Macroön (Acavus)) prospera, Pilsbry, Man Conch ser 2, vi, 1890, p 80, pl 17, figs 14, 15

Acavus prosperus, Pilsbry, ibid ix, 1894, p 154

Original description — "Testa imperforata, orbiculato-globosa, solida, distincte striata, unicolor castaneo-purpurascens, spira parum prominens, globosula, vertice rosea, anfractus 4 convexi, modice accrescentes, ultimus antice non protractus, mediocriter descendens, apeitura obliqua, oblongo-lunaris, basi rotundata, intus lactea, peristoma purpureum, expansum, breviter reflexum, margine dextro medio inflexiusculo, superne arcuato, columellari stricto, dilatato, vix excavato, sensim in basalem transcunte, paries aperturalis callo purpureo obductus

"Diam maj 44, min 34, alt 25 millim." (Albers)

Hab. Ceylon

It is stated to differ from A hæmastoma in being more globose, the depressed spire, rounded above, not conical, and in being unicolorous.

63. Acavus phænix. Pfeiffer.

Helir phomi, Pfeiffer, Malak Blatt 1, 1854, p 53, Hanley &

Theobald, Conch Ind 1875, pl 127, fig 6

Helm melanotragus, Férussac, Hist Nat Moll 1821, pl 32 s, fig 6

(var a); Donovan, Natural Repos iv, 1834, pl 133, Pfeiffer, Conch-Cab, Heliceen, i, 1846, pp. & 32, pl. 3, fig 3, pl 7, figs 9, 10, Chenu, Illustr Conchyl*, 1851, pl 5, fig 1, Reeve, Conch Icon vii, 1852, pl 71, fig 367

Helm (Acquis) melanotragus, Beck, Index, 1838, p 37

Helia (Macroon (Acavus)) phania, Pilsbry, Man. Conch ser 2,

vi, 1890, p 80, pl 17, figs 10-12

Acavus phanix, Adams, Genera Moll 11, 1858, p 195, Pilsbry, Man Conch sei 2, ix, 1894, p 154, pl 50, fig 5 (radula), fig 4 (egg), Randles, Proc Malac Soc London, iv, 1900, p 103, pl 9, figs 1, 4. 13 (nuatomy)

Original description —"T imperforata, globoso-conoidea, tenuiuscula, leviter rugata, subunicolor castanea, vel fusco, roseo et luteo radiatim variegata, non fasciata, rarius roseo-albida, spira brevis, convexo-conoidea, vertice subtili, obtuso, albido, sutura mediocris, plerumque fusco marginata; anfr 4 convexi, rapide accrescentes, ultimus ventrosus, plerumque spiraliter obsolete sulcatus, antice inflatus, sensim descendens, apertura perobliqua, truncato-oblonga, intus lactea, perist late expansum et reflexum, castaneo-limbatum, marginibus callo albo, extus castaneomarginato, junctis, dextro superne arcuato, columellari declivi. substricto, antice subtruvcato, sursum perdilatato, plano

"Diam may 58, min 43, alt 38 mill" (Pfeiffer)

Hab Ceylon (Blanford, Nevill)

Readily-distinguished from A hamastoma by its larger size. the more inflated whorls, and rather more depressed spire. The bands or zones of that species are usually lacking, but I have before me two specimens from the H Nevill collection which show a subsutural and two supra-peripheral bands, the former and one of the latter very distinct for the greater part but disappearing on the latter half of the last whorl Many specimens from the same collection are transversely streaked, others are much paler with brown peristome, some being almost white with rosy lin, and one is an albino having a pure white peristome

From A superbus and A greviller it may be separated at once by the more globose body-whorl and the less truncated columellar

plate.

64 Acavus superbus, Pfeiffer.

Hehx superba, Pfeiffer, Zeitschr Malak vn, 1850, p 71, Reeve, Conch Icon vn, 1852, pl 71, fig 368, Pfeiffer, Conch-Cab, Heliceen, in, 1853, p 342, pl 133, figs 1, 2, Hanley & Theobald, Conch Ind 1875, pl 127, fig 4

^{*} This work contains two different plates of Helix numbered 5 and two numbered 8

Helix (Acarus) superba, Pfeiffer, Malak. Blatt. ii. 1856, p. 144 Nevill. Hand List, i, 1878, p. 80

Acarus superbus, Adams, Genera Moll. ii, 1858, p 195; Pilsbry, Man Conch ser 2, ix, 1894, p 154; Randles, Proc. Malac Soc London, vi, 1900, p. 103, pl 9, figs 3, 14 (auatomy)

Helia (Macroon (Acarus)) superba, Pilsbry, Man. Conch. ser 2. vi. 1890, p 81, pl 16 figs 3, 4,

Original description - " T. imperforata, semigloboso-turbinata. solida, irregulariter malleata et cingulis obtusis parum elevatis munita, haud mtida, opaca, castanea; spira brevis, conoidea, apice obtusiusculo pallida; sutura mediocris; anfr. vix 4 rapide accrescentes, vix convexiusculi, ultimus' peripheria subangulatus. basi planus, antice descendens; apertura perobliqua, angusta, oblonga, intus cœrulescens, nitida; perist, album, fusco-limbatum. late expansum, incrassato-reflexum, marginibus subparallelis. callo crasso junctis, columellari calloso, perdilatato, plano, introrsum dente transverso usque ad marginem dextrum producto, munito.

" Diam. maj 55, min. 40, alt. 85 mill ' (Pfeiffer.)

Hab. Cevlon (Nevill, Gardener).

This handsome species may readily be separated from hamastoma, phænix, fastosus, and prosperus by the more pronounced angulation of the periphery. The back of the body-whorl is provided with some obliquely descending malleations, a feature lacking in the other species, and the columellar plate is also broader in most specimens In some the lip, which varies from light or dark brown to deep rose, is white on the inner edge, while I possess two specimens from the H Nevill collection with a pure white lip; these two shells are, moreover remarkable in not being unicolorous, the earlier whorls and the first two-thirds of the last whorl exhibiting dark brown bands on a light ground, regresented by the formula 023(45), all these bands becoming confluent on the latter portion of the last whorl

Var. grevillei. Pfeiffer.

Helix grevillei, Pfeiffer, P.Z S 1858, p 387, pl. 36, fig. 8, ibid., Novit. Conch. ser 1, i, 1858, p 108, pl 30, figs 6, 7: Hanley & Theobald, Conch. Ind. 1875, pl. 127, fig. 7. Helix (Acavus) grevillii, Martens, Die Heliceen. ed. 2, 1860 p 172; Nevill, Hand List, i, 1878, p 80 Helir (Macroon (Acatus)) superba, var grevillei, Pilsbry, Man Conch ser 2, vi, 1890, p 82, pl. 12, figs 47, 48

The peristome, parietal callus and columellar plate are blackish brown in most specimens, but in a shell from the H. Nevill collection they are jet-black, the shell itself being greyish-black In other respects this form cannot be separated from typical A. superbus.

51 ACATUS

Var roseolabiata, Nevill

Helix superba, Hanley & Theobald, Couch Ind 1875, pl 127. fig 4

Helix (Acarus) superba, var roseolobiata, Nevill, J A S B l. 1881. p 134

Helia (Macroon (Acarus)) superba, var voseolabiata, Pilsbry, Man Conch ser 2, vi, 1890, p 82, pl. 16, figs 1, 2

Like the last it can only be separated from typical A superbus by the colour of the lip, which varies from pale to a brilliant deep rose.

65 Acavus waltoni. Recve

Helix valtoni, Reeve, P Z S 1842, p 49, abid, Conch. System 11,

1842, pl 166, fig 23

Helix walton, Pfeisler, Mon Helic Viv. i, 1847, p. 19, Férussic, Hist. Nat. Moll. p. 303, pl. 93, figs. 1, 2, Reeve, Conch. Icon. vii, 1852, pl. 72, fig. 372, Pfeisser, Conch. Cab, Heliceen, n, 1853, p. 267, pl. 121, figs. 1-3, Chenu, Man. Conchyl. i, 1859, p. 453, figs. 3383, 3385, Figurer, Vie & Mœurs des Anim. 1866, p. 385, figs. 204, 205, Hanley & Theobald, Conch. Ind. 1875, pl. 127, fig. 1, Sarasin, Ergebn. Nature. Forsch. Ceylon, 1, heft. 2, 1888, pp. 355-69, pl. 6-8 (outbreakers). pp 35-69, pl 6-8 (embryology)

Helir (Acarus) waltons, Albers, Die Heliceen, 1850, p. 109. Nevill, Hand List, 1, 1878, p. 81, Cooke, Cambr. Nat. Hist. in, 1895, p. 304, fig. 204

Oligospira walton, Ancey, Conch Exch 11, 1887, p 22

Helia (Macroon (Acavus)) walton, Pilebry, Man Conch ser 2, vi. 1890, p 83, pl 18, figs 20, 21

Acarella walton, Jousseaume, Mcm Soc Zool France, vii 1894.

Acavus valtoni, Pilsbry, Man Conch ser 2, 1x, 1894, p 154

Acarus walton, Randles, Proc. Malac. Soc. London, 11, 1900. p 103, pl 9, figs 6 (radula), 10, 15 (anatomy)

Original description .- "Hel testa ovata, depressa, anfractibus ventricosiusculis, ultimo superne productiore, rubido-fusca, radiis longitudinalibus obsolete picta, epidermide tenui, peculiariter maculosa, induta, apertura subquadrato-ovali, marginibus nigerrimis disjunctis, labro acutissime reflexo" (Reeve)

Major diam 48-59, minor 32-39 mm, alt 30-31 5 mm

Hab Cevlon

The hydrophanous patches of the periostracum are very characteristic of the species and, while being almost obsolete in some specimens, form definite patterns in others, in one specimen in my collection they are disposed in spiral bands, in another they form obliquely descending patches above and spiral bands below the periphery, while in a third shell they are so crowded as practically to cover nearly the whole of the surface peristome and parietal band vary from a deep blackish to light The sculpture also varies considerably, the purplish brown earlier whorls have the transverse strice cut into granules by the incised spirals, a feature which in some shells is equally pronounced on the body-whorl, but in others becomes almost

obsolete; in some the body-whorl is more or less malleated in places, in others it is covered with spiral furrows

Var. polei. Collett

Acavus (Oligospii a) poleii, Collett, J Ceylon Br R A S xi, 1899, p 153, hgs A, B (shell), C (egg). Acavus poles, Randles, Proc Malac Soc London, 1v. 1900, p. 105. pl 9, figs. 7, 11, 16 (anatomy)

Hab. Cevlon. Udagama (Pole)

The only character differentiating this form from A. walton appears to be the white peristome and parietal callus Some anatomical differences are indicated by Mr Randles, but I doubt these being of sufficient diagnostic value

66. Acavus skinneri, Reeve.

Helix skinneri, Reeve, Conch Icon vii, 1854, pl 197, fig 1387, Hanley & Theobald, Conch Ind 1875, pl 111, fig 1, Dohm, Conch Cab, Heliceen, iv, 1881, p 601, pl. 175, figs 13, 14, Semper, Reisen Arch Philippinen, Wiss Res 2, iii, 1870, p 100, pl 12, fig 7 (anatomy), pl 16, fig 5 (radula)

Helix (Acavus) skinneri, Pferfer, Malak Blatt ii, 1856, p 144,

Nevill, Hand List, 1, 1878, p 81

Acavus skinner 2, Frauenfeld, Verh K-K zool-bot Ges xix, 1869, p 876, Pilsbry, Man Conch ser 2, 12, 1894, p 154, pl 50, ings 1, 8, 26 (anatomy, etc.), Randles, Proc Malac Soc London, iv, 1900, p 103, pl 9, fig 5 (anatomy)

Oligospina skinneri, Ancey, Conch Exch ii, 1887, p 22

Heliz (Macroon (Acaus)), Pilsbry, Man Conch ser 2, vi, 1890,

p 84, pl 18, figs 17-19

Acavella skinner; Jousseaume, Mém Soc Zool France, vu, 1894,

Original description - "Shell subglobosely depressed, thick, solid, very obliquely produced towards the aperture, everywhere minutely granulated, spirally broadly superficially grooved, livid chestnut, spirally freckled with a fulvous epidermis, disposed in hieroglyphic spots; spire short, rose-colour beneath, small; suture impressed, whorls three to four, last whorl very much the largest, aperture subquadrately oblong, hip externally broadly thickened, interiorly densely callous, continuous over the bodywhorl, everywhere deep purple-violet" (Reeve)

Major diam 31-38, min 22-26 mm., alt 17-22 mm.

Hab Ceylon (Skinner); Upper Onavah (Layard)

The species is characterized by the callous growth on the outside of the peristome, evidently formed by the accumulation of the reflexed portion of the lip In a specimen in my collection this growth measures 8 mm. in width. The numerous spiral ridges on the body-whorl appear to be a constant character. The earlier whorls have the same decussating incised spirals as in walton, but the body-whorl is very finely and regularly granulated, the granules being arranged in quincunx.

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Subfamily CORILLINÆ.

Genus CORILLA, Adams.

Corilla, Adams, Gen Rec Moll ii, 1855, p 208, Semper, Reisen Arch Philippinen, Wiss Res 2, iii, 1870, p 100 (anatomy), Pilsbry, Man Conch, ser 2, ix, 1891, p 117 (anatomy) Gude, Science Gossip, 's 8 iii, 1896, pp 88, 126 (armature), Pilsbry, Proc. Mal Soc. London, vi. 1905, p 288 (anatomy), Godwin Austen, Moll India, ii, 1907, p 199 (anatomy)

Atopa, Albers, Die Heliceen, 1850, p 90 (in part)

"Shell planorboid, with nearly plane spire and broadly open umbilious, the contour subcircular or oblong, rather solid, striated above, brown or yellow Whorls 5-51, the last deflected in front Aperture oblique, the lip broadly reflexed or recurved, its ends distant; parietal wall smooth or armed with a strong entering lamella Interior of the last whorl either without lamine or obstructed by a series of blades nearly parallel to the direction of the whorls, but having no transverse barriers

"Foot (of T erronca) with undivided sole and without pedal

grooves No mantle lappets Kidney very short.

"Jaw entirely smooth. Radula with about 79-85 teeth in a transverse row. Central tooth not smaller than the laterals, having a single cusp, shorter than the basal plate. Laterals similar but asymmetrical. Marginals having a large, simple,

oblique cusp longer than the square basal plate.

"Genital system elongated, with no accessory organs on the female side. Spermatheca having a long duct, which branches into a very long flagellum-like diverticulum, containing a cylindrical spermatophore, which extended from the end of the diverticulum to the vagina. Penis short, swollen distally, continued in the vas deferens upon which the penis retractor is situated, the distolend of the retractor being inserted on the interus. This species [Cerronea] is ovoviviparous, the uterus in the individual figured containing two young, having a membranous shell of about 5 mill diam, and more than 3 whorls

"The shell differs from that of *Plectopylus* in lacking internal barriers transversely obstructing the passage. When internal lamelies are present in *Corilla* they run parallel to the sutures or nearly so, as in *Polygyratia*. The central teeth are not smaller than the laterals as in *Plectopylus*, and there are further differences

in the genitalia." (Pilsbry.)

Type, Helix erronea, Albers.

Range Ceylon; Southern India (1 species)

When examining the soft parts of Corilla humber it in 1905, Prof. Pilsbry found that the additional data obtained threw no light upon the affinities of the groups with other Helicidæ He further states that the suspicion he formerly entertained that Corilla might be related to the Macroogona is negatived by the knowledge we now

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have of the lungs of both groups, and that we do not yet know enough of the anatomy of *Plectopylis*, *Stegodera*, or *Traumatophora*, to demonstrate any relationship between them and *Corilla*, though it is natural to suppose that these genera stand together. The genus, so far as we now know, stands by itself, he says, and for it alone a subfamily Corillina must be erected, which for the present might be placed next to the Camanina

Lt-Col Godwin-Austen, on the other hand, considers that the generative organs in Coulla are remarkably similar to those of Plectopylis, while another striking character common to both

genera is found in the liver.

Albers in 1850 established the genus Atopa for the reception of three species previously classed in Helm, 1 e achatma, Gray, refuga, Gould, and rivolis, Desh The name being preoccupied in Coleoptera (Fabricius, in Paykull, Faun Suec ii, 1799, p 116) H and A. Adams in 1855 proposed Covilla in lieu, adding a fourth species, erronea, Alb. No type was indicated, but the first of the species enumerated being achatma, the name Covilla would, under a strict application of the law of priority, have to be assigned to Helix achatma and its allies, while Pleutopylis would become a synonym No useful purpose, however, would be served by such a process; on the contrary, much confusion would arise, and it therefore appears advisable to accept the status of these two

genera as defined by Benson and Pilsbry.

The genus Conila is especially remarkable from the fact that the immature shells are provided with barriers which invariably The parietal folds differ from those found in full-grown ones are not formed until the shell approaches completion, while the palatal lamella of immature shells are always much larger, being almost triangular, overlapping, and reaching nearly to the parietal From what we know of the retention of ancestral characters in young individuals, as explained by Daiwin ('Origin of Species,' sixth edition, p 388), it may, I think, safely be assumed that the immature form of barriers found in the young shells represents the form of lamellæ which were possessed by the progenitors from which the existing armed members of the genus have sprung Consequently, those species which have to some extent retained such characters in the adult stage (1 e Corilla anaa and C beddomea) are the older forms; while those species which have diverged most in the adult state (1 e the group of C erronea) are of more recent origin. A singular fact in this connection is that whereas in the adult state C adams, possesses no armature, immature shells are provided with five palatal lamellæ, the same When publishing as obtains in the other members of the genus my observations on the armature of the various species of Corilla in 1896 I was ignorant of this fact and I am not aware that this has ever been pointed out Among a number of shells in various stages of growth, sent to me by the late O Collett, were several young specimens of C adams, and upon opening these I discovered that they were furnished with palatal lamellæ similar

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in shape and size to those previously observed in the other species. One specimen having completed nearly three whorls was provided with these barriers at the beginning of the third (post-embryonic) whorl. The natural inference is therefore that these lamells are formed almost immediately after the young animal is born

That structures of this nature serve as a means of defence against the attacks of carnivorous insects and similar creatures was suggested as long ago as 1829 by Guilding, who, in speaking of the teeth and laming of the Pupida, observed that "they may answer the purpose of an operculum to keep out enemies, while they afford no obstacle to the motions of the soft and yielding body of the animal" (Zool, Journ, 1v, 1829, p 168, footnote) Of much interest in this connection is a note by Lt -Col. Godwin-Austin, who, in a paper on the genus Plectopylis, states that " when breaking up a number of shells to expose the barriers and ascertain if their characters were constant, I was greatly interested to had in two instances the presence of small insects that had become fixed between the teeth" He further remarks that those shells possessing such bars to the predatory visits of insects, such as certain kinds of beetles, ants, or even leeches, all of which swarm in the forests where the shells are found, would have the best chance of surviving (Proc Zool. Soc. 1874, p. 611)

A careful examination of a number of immature shells, moreover, has revealed the fact that a new set of palatal lamellæ is formed on the completion of each half of a whorl, after which the previous set is absorbed by the animal. I have observed several specimens which contained two sets of barriers at a distance of half a whorl; in some cases the older set had almost vanished, only the foundations of the lamellæ being visible from the outside

through the shell-wall

The fact that C. adams upon reaching maturity dispenses with armature gives some scope for speculation. Without being acquainted with the local conditions it is of course impossible to solve the problem, but it may be surmised that the absence of predatory insects may have produced this result and that the formation of barriers in the immature shells is simply the survival of an ancestral character

Key to the Species.

A Mature shell without internal folds a Shell larger, dinmeter 29 mm adamsı. & Shell smaller, diameter 22 mm v. hinidimensis B Shell with internal folds a Palatal folds oblique a Two parietal folds beddomeæ B Three parietal folds anas. b Palatal folds horizontal a One parietal fold Tumberts B Two parietal folds odontophora

v Three parietal folds. Shelf elliptic, palatal folds short, second scarcely curved †. Lip much reflected Two upper palatal folds terminating near the peristome collette §§ Palatal folds terminating further hack carabınata †† Lip little reflected Shell strongly and regularly ribbed . auder. §§. Shell more faintly and irregularly ribbed 1 Third palatal fold almost horazontal erronea. 2 Folds very short, nearer aperture. third palatal fold very oblique, ascending v erronella. rounded, palatal folds longer. ** Shell second much curved

67 Corilla adamsi, nom. mut.

p 156, pl 33, figs 9, 10

Helix charpentieri, Pfeiffer, P Z S 1853, p 127 (non Helix charpentieri, Scholtz, Schlesien's Land- und Wasser-Moll 1843, p. 28), Reeve, Conch Icon vii, 1854, pl 185, fig. 1285, Hanley & Theobald, Conch Ind 1870, pl 14, fig 1, Brot, Journ Conchyl. xii, 1864, p 22, pl 2, fig 11

Covilla charpentieri, Frauenfeld, Verh K-K. zool-bot Ges xix, 1869, p 876, Gude, Science Gossip, N s mi, 1896, p. 88, fig 1

Helix (Covilla) charpentieri, Nevill, Hand List, i, 1878, p 70

Helix (Atopa) charpentieri, Tryon, Man Conch ser. 2, m, 1887,

Original description —"Testa umbilicata, discoidea, solidula, oblique costato-striata, parum nitida, virenti-cornea; spira regulari, plana; anfractibus 51, lente accrescentibus, modice convexis,



Fig 12 - Corilla adamsı

ultimo rotundato, antice profunde descendente, umblico lato, conico, subirregulari; apertura fere horizontali, rotundato-lunari, intus albida, prorsus edentula; peristomate albo, undique late expanso et reflexo, marginibus convergentibus, infero ad insertionem attenuato." (Pfeiffer.)

Diam maj. 27½, min 22, alt. 9 mill Hab. Ceylon (Layard, Collett); Nanu Oya jungle (Preston) Among all the known species of Corilla the present one is unique as being devoid of barriers in the mature shell. When publishing my series of articles on the Armature of Helicoid Land-shells in Science Gossip, N. s. vol in, 1896, et seq I simply recorded that Corilla charpentiers [C adams] was devoid of armature (tom cit p 88) I was not then aware of the remarkable fact that this statement only applies to full-grown shells and that at earlier stages the species is furnished with palatal laminæ similar to those found in immature shells of the other species of Corilla, except that they are less oblique and consequently less overlapping Among a number of shells I received in 1896 from the late O Collett and subsequently from Mr H. B Preston, were several specimens of Corilla adams in various stages of growth, and upon opening some of the latter I was astonished to discover the palatal barriers. These occurred in specimens which had only four whorls, others possessed them where 41 whorls had been completed, while some had two sets of barriers, in one of which the earlier set had been partly absorbed

Apart from the absence of barriers in mature shells, Corilla adams, is readily distinguished from all its congeners by its more rounded outline, its higher axis, the regular and coarser ribs. In

colour it varies from pale corneous to dark chestnut

Owing to the fact that *Helix charpentieri* of Scholtz (1843) antedates Pfeiffer's name (1853) I have been reluctantly compelled to change the latter. I have associated with the species the name of the brothers Adams who proposed the name *Corilla*.

Var hinidunensis, Nevill

Corilla himdunensis, Nevill, Enum Helic Pneum Ceylon, 1871, p 1
Corilla charpentieri, var himdunensis, Pilsbry, Man Conch ser 2, 1x, 1894, p 148, pl 41, figs 23-25, Gude, Science Gossip, N s in, 1896, p 127, fig 15



Fig 13 - Corilla adamsı, var handunensis.

The late Col Beddome favoured me with the loan of a specimen received from Nevill, for the purpose of illustration. This specimen is here reproduced. It measures 22 millim in diameter

68. Corilla beddomeæ, Hanley.

Helix (Plectopylis) beddomeæ, Hanley, Conch Ind 1875, p 60 (no description), pl. 150, figs 1, 2
Plectopylis beddomei, Pilsbry, Man Conch ser 2, ix, Index, 1895, p 121
Corilla beddomeæ, Gude, Science Gossip, N s in, 1896, p 127, figs 13, 14.

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Shell widely umbilicated, rotundate, discoid, somewhat thin. dark chestnut or blackish brown, irregularly costate, on the last whorl the costa are intermingled here and there with obliquely descending wrinkles, dull above, shining below. Spire plane, suture a little impressed Whorls 51-6, flattened above, tumid below, bluntly carmated above the periphery, a few traces of spiral sculpture on the lower surface, the last dilated towards the month shortly and abruptly descending in front. Aperture oblique, almost subhorizontal, elliptic-ovate; peristonie livid, thickened and reflected, upper margin nearly straight, outer curved, lower straight with a subquadrate callus, columellar very short, obliquely ascending; a slight ridge on the parietal callus connecting the margins of the peristome and giving off a long, sinuous, entering fold, ascending at first, the posterior extremity descending, below this occurs a shorter, free, flexuous, horizontal Palatal folds 4, the first (upper) slightly ascending towards the aperture, and considerably attenuated anteriorly, the second

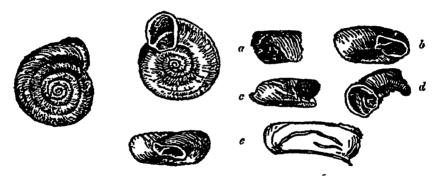


Fig 14 - Corilla beddomeæ (type)

Fig 15 — Corilla beddomeæ, small variety

and third shorter, more elevated and more oblique, the fourth subparallel with the lower suture

Major diam. 175-20, minor 14-16, alt 6-65 mm.

Hab Ceylon; Haycock Mountain (Beddome); Ambegamuwa,

Watawala, Newara Eliya (Collett)

This shell was formerly extremely rare in collections, but the late O Collett sent considerable numbers of it to England. Prof Pilsbry, in referring the species to Plectopylis, was probably guided by its external characters. The absence of vertical or transverse barriers on the parietal wall, however, amply warrants its inclusion in Corilla. It differs in appearance from the other species, being wrinkled, thinner in texture, and much flattened above Fig 14 shows the type in the late Col. Beddome's collection It measures 20 mm. in diameter A small variety, from Watawala, in Mr. Personby's collection, is shown in fig 15. It is less coarsely wrinkled than the type, and is also paler and smaller, measuring only 16 mm in diameter. Fig 15 e, which

palatal plates also are seen to be much broader than in the other species, and the three upper ones are much more oblique, resembling in this respect the immature plates found by me in three of the other species. In fig 16 e a portion of the last whorl is drawn, in which the palatal plates nos 1, 2, and 3 are shown as they appear through the shell, while fig 16 b shows the entire shell from below with palatal plates nos 3 and 4 shining through. The late Col. Beddome lent me several adult examples of this species for examination, one of which is of interest from the fact that it exhibits, in addition to the inature armature, immature plates which are identical in form and position with those I found in an adult shell of Corilla odontophora. With these adult examples was an immature shell with three whorls completed,

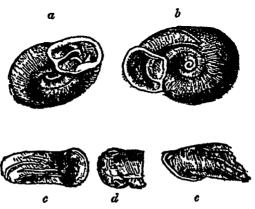


Fig. 16 -Corilla anax

which is specially noteworthy in that it possesses two sets of immature plates, one near the end of the third whorl, and the other a little beyond the place where $2\frac{1}{2}$ whorls have been completed. It may therefore safely be inferred that the plates are not absorbed till after completion of the new ones, and it will be remembered that this is not an isolated case, for two sets of plates have been observed by me in a full-grown specimen of Corilla odontophora, and Col Beddome lent me a shell of this last-named species, identical in this respect. He informed me that he collected his specimens of Corilla anax in the Anamullay Hills, in the Coimbatore District of South India, in moist woods, at 2000 feet elevation, where it was very abundant on and under dead logs.

The specimen shown in fig. 16 is in Mr. Ponsonby's collection

70. Corilla gudei, Sykes.

Corilla guder, Sykes, Proc Malac. Soc London, in, 1897, p 234, pl 16, figs. 8-10, Godwin-Austen, Moll. India, ii, 1907, p 199, pl 114, fig. 3 (anatomy).

Original description: - "Size and shape similar to those of

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C. erronea; the last wnorl, however, more destending and more contracted at the spot where the lamellæ show most conspicuously through the shell. Sculpture nearly as strongly marked on the lower as on the upper surface; C. guden differing thereby from all other known Ceylon forms akin to it and recalling the Indian C anax. Outer hip slightly more reflexed than in C. erronea; the mouth not so drawn out and slightly more rounded. Palatal and parietal lamellæ the same in number as in C erronea, but somewhat shorter; differing also in situation by being more nearly parallel, especially (counting from above) the second and third palatal ones. Umbilical area more impressed in the present species. Colour a little lighter than in C erronea, a few specimens have a rosy tint.

"Long 23-22, lat 16-17, alt 7-65 mm." (Syles)

Hab Cerlon Karunegala (Collett)

. "As compared with C. anax, the present species differs in having one whorl more, the whorls being more flattened above, the lip more reflected, and the last whorl not so inflated or

produced " (Sules)

In addition to the differentiating features referred to by Mr Sykes, C guder, in spite of the fact that it possesses nearly a whole whorl more than C anax, is about 5 mm shorter in its major diameter, the ribs are a little coarser and more widely spaced, and the mouth is much less dilated transversely. The second and third palatal lamello, moreover, are much less oblique and nearer the aperture

A number of immature shells of various sizes, received from the late O Collett, possess the immature barriers, similar to those observed by me in all the other species of Corilla One specimen has nearly three whorls completed and is provided with the usual five palatal lamello about one-quarter of a whorl beyond the post-

embryonic whorl

71 Corilla humberts, Biot

Heliz humberti, Brot, Journ Canchyl xii, 1864, p 21, pl 2, figs 5, 6, Hanley & Theobald, Conch Ind 1876, pl 159, fig 9

Helix (Corilla) humberti, Nevill, Hand List, 1, 1878, p 70

Helia (Atopa) humberti, Tryon, Man Conch ser 2, iii, 1887, p 156

pl 33, figs 22, 23,

Corilla humberti, Pilsbry, Man Conch ser 2, 1x, 1894, p 148
Gude, Science Gossip, N s 111, 1896, p 92, fig 11 (shell and armature), Pilsbry, Proc Malac Soc London, vi, 1905, p 288, pl 13, figs 1-3, pl 14, figs 10-12 (anatomy)

Original description — "T late et profunde umbilicata, discoidea, subirregularis, solidula, superne costulato-striata, subtus vix striatula, nitida, unicolor olivaceo-fusca; spira plana Anfr 5 vix convexiusculi, ultimus antice descendens Apertura obliqua, obtuse cordata, lamella una parietali, centrali, valida, sinuata et palatali una profunda, brevi (extus haud conspicua) coarctata

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Peristoma dilute olivaceo-fuscum, callosum, brevissime reflexum, marginibus callo elevato junctis, supero subdentato, infero dente quadrato munito

"Diam may 25, min 20, alt 9 mill" (Brot)

Hab Ceylon (Humbert, Collett); Newara Eliya and Watawala (Preston)

Differs from all other species of Corilla, except charpentiers and beddomea, in being more rounded in outline. From the former it is easily distinguished by its smaller size and in being a trifle more excentric, while from the latter it may readily be separated by the rounded whorls. In colour it varies from blackish brown to olivaceous corneous. Nevill* thiew some doubt on the correctness of Brot's figure of the species. When studying these



Fig 17 - Corilla humberti

shells in 1896, I applied to Dr Brot for the loan of his type and he was good enough to comply with my request , I was thereby enabled to confirm Benson's conjecture that the original figure was slightly misleading, as the basal palatal fold appeared to be joined to the suture, owing to the position in which the shell had been placed, but on tilting it from the left side, the fold was found to be quite unconnected with the suture, and I was therefore in a position to give a more correct figure, which is now reproduced This fold corresponds with the fourth in the other species, while the parietal fold corresponds with the second of the others examination of several specimens received subsequently from the late O. Collett and from Mr Preston, has, however, revealed the tact that the palatal fold is by no means a constant feature, for these specimens, without exception, are devoid of all palatal folds A few exhibit traces (visible from without) of an immature set of oblique folds on the penultimate whorl, but the folds themselves have been absorbed.

72 Corilla odontophora, Benson.

Heliv (Corilla) odontophora, Benson, A. M. N. H. ser 3, xv, 1865, p. 175, Nevill, Hand List, 1, 1878, p. 70

Helix odontophora, Hanley & Theobald, Conch. Ind. 1870, pl. 57, figs 4-6

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Helix (Atopa) odontophora, Tryon, Man Conch ser. 2, 111, 1887, p 157, pl 33, figs 24-26
Corilla odontophora, Pilsbry, Man Conch ser 2, 1x, 1894, p 148,

Gude, Science Gossip, A s in, 1896, p 91, fig 10 (shell and armature)

Original description.—"II. testa late umbilicata, rotundato- vel orato-discoidea, solidula, castanea vel rufescenti-lutea, superne subplanulata, oblique tenuiter costulato-striata, subtus valde concava, striata, nitida, spira planiuscula, versus apicem obtusum elevatiore, sutura impressa, anfractibus 4, primis convexiusculis, ultimo antice convexiore, tum descendente, dilatato deflexo, subtus valde inflato; apertura perobliqua, obtuse subcordata, lamellis 2 parietalibus (superiore longe intrante curvata, inferiore subparallela, breviore, subcurvata, ab apertura remotiuscula), palatalibus 4 brevibus semilunaribus vel sinuatis (omnibus integris ab apertura conspicuis, extus perlucentibus) coaretata, peristomate purpurascenti-albido vel castaneo, calloso, breviter reflexo, marginibus superiore et inferiore subdentato-incrassatis

"Diam maj 22-26, mm. 17-19, alt 7-8 mill" (Benson)

Hab Ceylon Fort McDonald (Layard); Uda Pussellawa
(Picston)

The figure given of C edontophora in Conch Ind pl 57, fig 4, and copied in Tryon's work, pl 33, fig. 24, is somewhat misleading, as it evidently represents an immature specimen, although no reference is made to this fact. The figures now reproduced illustrate a specimen in Mr. Ponsonby's collection. On reference to fig 18 b it will be seen that only two parietal folds are

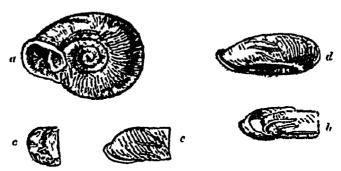


Fig 15 - Corilla odontophora

present. Fig 18 c exhibits the barriers as seen from behind their inner terminations, and it will be observed that there are four palatal folds, the upper three (visible through the shell-wall) are shown in figs 18 d and 18 c, while fig 18 a exhibits the underside of the shell with the third and fourth folds showing through They are much shorter and less flexuous than in either C erronea or C frya and, as stated by Benson, are entirely visible from the aperture Another point to be noted is that the outer terminations (t c. nearest the aperture) of the upper three palatal folds

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form an oblique line parallel with the peristome, the first one being nearest the aperture, whereas in C. erronea and C. fryæ they form a semi-circle, the second fold being nearest the aperture. The shell of C. odontophora is more regularly and less coarsely ribbed than that of C. erronea, and is larger, although composed of only from 4 to 4½ whorls, while the other two species possess 5 whorls. It further differs from C. erronea in that the last whorl is more deflected in front, more tumid, and then suddenly contracted behind the peristome, more resembling C fryæ in these respects, as also in the presence of a quadrate tooth on the basal margin of the peristome. This specimen, moreover, although adult, exhibits the immature form of palatal folds (see fig. 18 a) immediately behind the callus of the mouth; the folds themselves, however, have already been absorbed.

73 Corilla fryæ, Gude

Corilla fryæ, Gude, Science Gossip, N s III, 1896, p 89, figs 2, 4, 5, 6

Original description — "Testa late umbilicata, ovato-rotundata, discoidea, solidula, rufo-castanea, planulata, oblique costulata subtus valde concava, striata, pernitida; spira plana, sutura vix impressa. Anfr. 5, vix convexiusculi, inter suturam et peripheriam valde angulati, ultimus subtus ornatur striis spiralibus que secundum latus lineis vel rugis impressis obliquis decussantur, antice convexior, valde dilatatus, profunde descendens. Apertura obliqua, obtuse subcordata, lamellis 3 parietales (media elongata, validaque, laterales minores, profundæque) 4 palatales flexuosæ, longulæ, perlucentes, 3 ab apertura visibiles Peristoma exalbido purpurescens, vel rufo-castaneus, callosum valde reflexum, margo superior sub-dentate crassior, inferior dente valido atque quadrato armatur

"Diam. maj 26, min. 20, alt 8 mm." (Gude)

Hab. Ceylon Albion Estate, Lindula Districts (Mrs. Fry),

Ambegamuwa (Collett).



Fig 19 - Corilla fryæ

Corilla fryæ differs from C. erronea in being more rounded in outline, larger, darker in colour and more shining beneath, the ribs are more regular and less coarse, the whorls are less convex, almost flattened and distinctly angulated, almost keeled, midway between the suture and the periphery, while the suture is less

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impressed: the last whorl is more constricted, and suddenly widens towards the aperture, becoming again constricted behind the peristome, and it is more deeply deflected in front . the mouth is much less oblique, the palatal folds are longer and more flexuous, and the tooth on the basal edge of the peristome is longer and more quadrate; in this latter respect, as well as in contour and shape, it more resembles C. odontonhora. Fig. 20 b shows the barriers from behind, a piece of the shell-wall having been broken away] A reference to fig 20 a, which exhibits the parietal folds, will explain why the upper fold is invisible from the aperture, being hidden by the median fold with which it unites about the middle Figs 19 5 and 19 c show that the palatal folds are distinctly visible through the shell-wall The specimens delineated in figs 19, 20, and 21 are all mature and being composed of five whorls, it follows that the barriers are placed near the end of the fifth whorl In fig. 20 c the second palatal fold is shown by itself, the upper convex line indicating its attachment to the shell-wall



An immature specimen was found to contain five palatal plates in the fourth whorl, the upper four being much broader and more elevated than those in mature shells, reaching nearly to the inner wall, they overlap, being placed close together, slanting obliquely



Fig 21 -Corilla frye, immature, × 2

upwards, but scarcely curving, the fifth (lowest) is very short and narrow and corresponds in position to the fourth fold in the full-grown shells. Fig. 21 shows the four upper plates as seen through the shell-wall. A still younger shell received from the late Mr Collett possessed a set of these immature barriers at the beginning of the third whorl, a short distance from the nepionic part of the shell, demonstrating that the animal begins to form these structures almost directly after being hatched

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74. Corilla erronea, Albers.

Helix rivoli, Pfeiffer (non Deshayes), Mon Helix Viv 1, 1848, p 407. Reeve, Conch Icon vii, 1852, pl 78, fig 413, Pfeiffer, Conch-Cab, Heliceen, n, 1852, p 238, pl 112, figs 16-19, m, 1853, pl 160, figs 8-11, 14, 15

Helix en onea, Albers, Zeits Malak x, 1853, p 107, Kobelt, Illust Conch Buch, 1879, pl 68, fig 37, Biot, Journ Conchyl xii, 1864, pl 2, figs 7-9

Anchistoma (Corilla) er i oneum. Adams. Gen Rec Moll. 11. 1855.

Corilla er onea, Frauenfeld, Veih K K zool-bot Ges xix, 1869, p 876, Semper, Reisen Arch Philippinen, Wiss Res 2, iii, 1870, p 100, pl 12, fig 18, pl 16, fig 4 (anatomy), Pilsbry, Man Conch ser 2, ix, 1894, p 148, pl 41, fig 19 (armature), pl 42, figs 37, 38 (anatomy), Gude, Science Gossip, N s in, 1896, p 89, fig 3, p 90, fig 7 (shell and armature)

Helic (Covilla) evonea, Nevill, Hand List, 1, 1878, p 70

Helia (Atopa) er onea, Tryon, Man Conch ser 2, m, 1887, p 157, pl 33. figs 19-21

Original description - "Testa latissime umbilicata, oblongodiscoidea, superne plana, irregulariter costulato-striata, fusca, basi lævigata, fusco-olivacea, nitidissima; anfractus 5. ultimus in latere testæ sinistro angustatus, antice dilatatus, paululum descendens; apertura obliqua, obtuse obcordata, intus margaritacea, 4-lamellata; lamellis tribus in pariete aperturali, media valida, prominens, laterales breviores, profundæ, lamella palatalis singula profunda, interstitio inter lamellam ventralem mediam et sinistram opposita peristoma callosum, breviter reflexum, marginibus callo mediocri cum lamina ventrali media confluente, junctis, basali callo oblongo, dentiformi incrassato

"Diam maj. 15, min 18, alt. 7 millim" (Albers) Hab Ceylon Newara-Eliya (Nevill, Blanford)

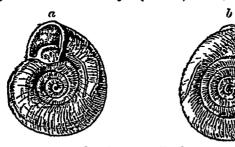


Fig 22 - Coulla fryæ

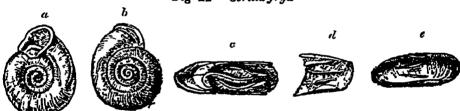


Fig 23 — Covilla erronea

67

The palatal plates are disposed in much the same manner as in C fryw, but they are shorter and less curved (see fig 23 d), which shows a portion of the inner side of the outer wall with the palatal plates in situ. The parietal folds are almost identical in shape and position with those in fryw (see fig 23 c) but they are shorter and the union of the first and second (upper and median) folds is not so complete. The specimen shown in fig. 23 c is of interest on account of a small adventitious denticle between the second and third folds

Var erronella, Gude

Corilla erronea, var erronella, Gude, Science Gossip, & s in, 1896, p 127, fig 16

Much smaller and thinner than C. erronea, and the palatal lamellæ much shorter and placed much nearer the mouth of the shell. The outer terminations of the parietal folds and the whole of the thin upper palatal lamellæ are visible from the aperture (see fig 24a) The third palatal lamella, which in C. erronea is



Fig 24 - Corilla erronea, yar erronella

nearly horizontal, is here strongly oblique and ascending, while the fourth reaches nearly to the peristome (see fig. 24c) Known from a unique specimen in the late Col Beddome's collection. He received it with the MS name C crronella. Nevill.

75 Corilla carabinata, Ferussac

Helicodonta carabinata, Firussac, Tabl. Syst. Limaçons, 1821, p. 38, n. 109

Helix carabinata, Férussac, Hist Nat Moll, Expl Planches, 1822, p in, pl 51 B, fig 3 (shell and armature); Bowdich, Elem Conch 1822, pl. 7, fig 19, Deshayes, Anim sans Vert ed 2, viii, 1838, Delessert, Rec Coq 1841, pl 26, fig 8, Guerin, Icon Règne Anim, Moll 1844, pl 6, fig 5, Chenu, Ill Conch 1850, pl 12, fig 8

Helix rivolu, Deshayes, Encycl M6th, Vers, 11, 1830, p 208, 1bid in F61 ussac, Hist. Nat Moll. 1, 1839, p 7, Pfeisser, Conch-Cab, Heliceen, 111, 1853, p 489, pl 160, figs 12, 13, Reeve, Conch Icon vii, 1854, pl 185, fig 1284, Chenu, Encycl Hist Nat, Moll 1858, p 133, figs 7-9, Brot, Journ Conchyl xii, 1864, pl 2, fig 10, Hanley & Theobald, Conch. Ind 1870, pl 14, fig 2 Helix (Atopa) rovolu, err typ, Albers, Die Heliceen, 1850, p 90 Anchistoma (Atopa) rivolu, Chenu, Man Conchyl 1, 1860, p 463, figs 3452-54

Helia (Corilla) revolu, Nevill, Hand List, i, 1878, p. 70

Corilla rivolis, Frauenteld, Verh. K K zool.-bot Ges xix, 1869, p. 876; Tryon, Struct Conch. in, 1884, p 33, pl. 94, fig. 24, Pilsbry, Man Conch ser 2, ix, 1894, p 148, pl. 41, figs 20-22, Gude, Science Gossip, N s iii, 1896, p 91, figs 8, 9 (shell and armature)

Helix (Atopa) rivolu, Tryon, Man Conch ser 2, m, 1887, p. 156, pl 33, figs. 11, 12

Original description — "H testa alba, vitrea, utroque latere concavo-planulata, ellipsoidea; spira irregulari, superne striata, inferne levigata; anfractibus gyratis, ultimo majore, ad aperturam depressis; apertura dilatata, tubesformi obliqua, rotundato-semilunari, intus quinquedentata, dente collumellari alteris longiore"

Major diam. 23-25, minor 16 5-17, alt. 6 25-7 mm Hab. Ceylon (Templeton); Kandy (Nevill, Preston)

When describing Helix rivoln in 1830 Deshayes was probably unaware of the fact that the shell figured by Férussac as Helw carabinata was identical with his own. In 1838, however, when editing the second edition of Lamarck's 'Animaux sans Vertèbres,' he acknowledges Férussac's name and relegates rivolis to the synonymy, reversing the process when editing Férussac's Hist Nat. Moli (vol 1, p 7, 1839), where he states that doubtless Ferussac had provisionally so-named the species, and that he has searched the dictionaries in vain for the meaning of the word carabinata. For this reason he thought it advisable to retain for the species the name he had himself proposed for it in 1830 While a few of the older authors adopted Férussac's name, every one dealing with the species since 1850 has recognized Deshayes' designation. Although Férussac did not give a description and livraison x, containing plate 51 B (numbered 101 in some comes) on which the species is figured, had no text with it, two sheets of 'Explication des Planches' were issued with livraison xvi in 1822 *, on page 111 of which the name H. carabinata duly occurs.

Under these circumstances Férussac's name must be adopted

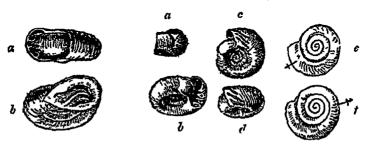


Fig 25 - Corilla carabinata

Fig 26 - Corilla caralmata immeture

In fig. 25 α the parietal and palatal barriers are exposed from behind, while fig 25 b shows the median parietal fold joining the callus at the aperture and the anterior terminations of the upper

^{*} A copy of this is in my possession

and lower folds In fig. 26 two immature specimens are delineated, of which a-e exhibit one with four whorls completed having five immature palatal plates. In fig. 26 e and f the dagger indicates the place where the barriers occur, in the former at the end of the fourth whorl and in the latter where only 3½ whorls have been completed. I also possess one specimen of 2½ whorls which is provided with a set of barriers at the end of 2½ whorls, distant about ½ whorl from the nepionic shell. Except in size these barriers do not differ from those in the other immature shells.

76 Corilla colletti, Syl cs

Corilla colletti, Sykes Proc Malac Soc London, 11, 1897, p. 233, pl 16, figs 11-13.

Original description—"Shape strongly recalling that of Crivoli, but the new species is much smaller in size. Sculpture also similar in nature, but finer and more closely set. The mouth in the present species not so much contracted and not quite so descending, the lip not nearly so reflexed and thickened. The palatal and parietal lamellæ are the same in number in both species, but in C. collett the former approach more nearly to the lip, especiall—the upper two. Of the parietal lamellæ, the upper and lower are more nearly parallel, and not so convergent, while the middle one is much shorter than in C rivola, and does not enter so fai into the shell

"Long 21-21 25, lat 14-15.5, alt 6-5.75 mm" (Syles)

Hab Ceylon Balangoda (Collett)

Genus PLECTOPYLIS, Benson

Plectopylus (section of Helix), Benson, A. M. N. H. ser 3, v, 1860, p. 244. Stoliczka, I. A. S. B. al., 1871, p. 217. Pilsbry, Man Conch. ser 2, ix, 1894, p. 143, Gude, Science Gossip, N. S. vi, 1899, pp. 147, 174. Godwin-Austen, Moll. India, ii, 1907, p. 201.

Type, Helix achatina (Gray), Pfeiffer [bensons, Gude].

Range NE India, Burma, Tonkin, South and Central China,

and Loo Choo Archipelago

"Shell depressed, with flat or low-conneal space and large umbilicus, dextral or sinistral, solid or thin, the upper surface generally sculptured with spiral lines, hirsute in the young. Aperture half-round or lunate, oblique, the lip reflexed, its end generally joined by an elevated parietal callus, which usually bears an entering lamella. Interior of the last whorl obstructed by a barrier composed of a transverse plate or plates on the parietal wall, and several transverse or longitudinal denticles or plates on the outer wall

"Foot short, rarely equalling in length the diameter of the

70 HELICIDE.

shell, tentacles very short, eye pedicles of moderate length Mantle-edge thin, with small right and left body-lappets. Pul-

monary cavity small. Kidney large, triangular

"Jaw very thin, horny, arched, with a small anterior median projection, it is marked transversely with a great number of more or less distant grooves which divaricate in the centre Radula of moderate width, long, composed of about 100 transverse more or less V-shaped rows of 60-70 teeth. Central tooth smaller, sometimes much smaller, than the laterals, very narrow, the reflection small, with three slender cusps Lateral teeth with a large inner cusp and simple or bifid outer cusp, and a minute inner cusp.

"Genital system having the duct of the spermatheca long. An organ of unknown homology (either a dart sack, a diverticulum of the spermatheca, or an appendicula) enters the vagina just above the opening of the spermatheca duct. Uterus containing tew large eggs. Penis simple, receiving the vas deferens and the penis retractor at its apex, the latter attached distally to the floor

of the lung cavity " (Pilsbry.)

Stoliczka was the first to investigate the anatomy of Plectopulis (1871), four species, achaina [bensoni], cyclaspis, pinacis, and maciomphalus, forming the subject of his memoir. It was not until thirty-six years subsequently (1907) that Lt -Col. Godwin-Austen tollowed with an account of the anatomy of P. cuclaspis Stoliczka states that on the whole the form of the body closely resembles that of Clausilia, and that a companison of the interior organization of the two genera also indicate their close relation. jaw he found similar in structure but different in shape greater, he continues, is the similarity of the Plectopylis jaw to that of Cylindiella, with the exception that the median projection is wanting in the latter. The arrangement of the teeth of P achatina [bensoni] and P. cyclaspis he also found to agree with that of Cylendiella in the very small size of the centre tooth, but In P. pinacis the this was not found to be a constant character centre tooth was larger and more of a shape similar to that of the lateral teeth, which, however, in all the species he found to retain distinctly the helicoid character.

Godwin-Austen found in *P. cyclaspis* the penis simple, like that of *Corolla*, but very short in comparison with the great length of the rest of the genitalia and other organs occupying the closely-wound many-whorled shell. He states that the vagina soon develops into the thin-walled oviduct, which was found occupied by about a dozen embryonic shells in various stages of development, the auterior ones, very well grown, showed the coiled visceral sac, and were covered with minute calcareous granules. The spermatheca was a thin cord with a sac-like expansion at the free end. The hermaphrodite duct was long, convolute, and

lying attached to the side of the albumen-gland

The intestine was long and cord-like, the salivary glands small

and elongate, the heart situated one whole whorl behind the aperture, and lying below the oval-shaped kidney. The oxiduct

was packed close to the heart

The jaw he found very thin and delicate, composed of 24 elongate plates which slightly overlap, the central plates being the largest. These plates were attached to a mass of muscular tissue, or, in other words, this muscular tissue merged into the more solid plates; in this respect there being a similarity to the jaw of Succinea; the resemblance to the jaw of Thisanota guerni being still greater

The teeth of the radula are stated to be thus disposed.

12.9.1 9 12 or 21 1 21.

The centre tooth is stated to be small, on a narrow oblong plate, the plates of the admedian teeth nearly square there being an indication of a duplication followed by fusing of parts, the square plate being divided into a long inner oblong portion and a shorter outer oblong portion with a well-defined rounded upper outer angle. At the 10th tooth the very long inner cusp of the 9th tooth he found to become bicuspid into blunt rounded points, the biscuspid form with a single small cusp outside it continuing to the outermost teeth. This type of radula, he notes, is peculiar to the genera Thysanota, Sylesia [Ruthvenia], and Philalanka, to a greater or less extent with modification of the central and admedian teeth

Stoliczka raised Plectopylis to generic rank, but Prof. Pilsbry in 1890 made it a section of Helix In 1894, however, he also accorded it generic status and in his Index to the Helicidæ, 1895, p. 124, it was placed between the groups Macroogona and Teleophallogona. He there included two Chinese groups of uncertain affinity—Traumatophora and Stegodera, each containing one species—but as nothing is known of their anatomy, and as, moreover, they are devoid of the armature characteristic of Plectopylis, their inclusion is hardly warranted

In 1899 the present writer divided the genus into seven sections, one of which—Sykesia [Ruthvenia] has since been shown to have affinity with Thusanota and Philalanka and which has already been dealt with (ante p 25). Another section—Enteroplas, proposed for the reception of three Philippine Island species—will probably share a similar fate when the soft parts come to be examined.

Benson had already noted that *Plectopylis achatina* [bensoni] was ovoviviparous, and this was found to be the case with all four species examined by Stoliczka. I have also observed this fact in

a specimen of P. lissochlamys

As regards the question concerning the probable primordial form from which the existing species have been evolved, this is very problematical, as no fossil forms are known Stoliczka, it is true, described three species of fossil Helices, which he referred to the section Anchistoma [=Gonostoma], stating that they had affinity with Plectopylis and Corilla (Cretaceous

Fauna of Southern India, n, 1868, p. 9 et seq.). Nevill, who examined these fossils, however, was of opinion that their appearance did not warrant this theory (J. A. S. B. l, 1881, p. 128).

It is likewise almost impossible to judge as to which of the known forms are the most archaic, since the armature of immature specimens, so far as they have come under my observation, throw no light on the subject, as they do in the case of Corilla, except in size and in the length of the folds, the barriers of mature and immature shells are almost identical. There is one exception in this respect, i.e. Plectopylis woodthorper, in which the palatal folds of the anterior series are only found in mature specimens. It may, however, be assumed that the simple armatures preceded the more complicated structures, and on this assumption P. bensom and its allies, with their complex parietal barriers, must be regarded as the most recent, while in another direction, P. plectostoma and its congeners, with their biserial palatal folds, have presumably been evolved from some monoserial predecessor, of which P. sowe by may be taken as a less modified representation

The distribution of the genus is somewhat peculiar The centre of distribution appears to be Lower Burma, especially Pegu and Tenasseriin, while no species occur to the south-east, the whole of Siam and Cochin China being blanks. Going east the Burmese Shan States and Laos each possess one species, while Tonkin has a considerable number. Upper Burma contributes one species from the Bhamo district—P. anderson, one from Munipur—P. munipurensis, and three species in the south—peraceta, ponsonby, and woodthorper. Assam has fourteen species Going west we find another blank tract until we reach Sikkim, the western limit of the genus, where there are five species Eastern Thibet provides a single form, P alphonsi, while Southern and Central China, including Hongkong, produce no less than seventeen species, and a single outlier occurs in the Loo Choo Islands.

Key to the Species.

I Section Endothyra, Gude (Third Section of Benson)

Simistral Umbilicus moderate Palatal folds horizontal or oblique. Type, P plectostomu

Range Sikkim, 1ssam, Burma

A Palatal folds in one series

a Shell 14-15 mm, horizontal fold below parietal

plate
b Shell not exceeding 9 mm, horizontal fold absent sowerbys.

B Palatal folds in two series

a Parietal plate without denticles

b Parietal plate with one denticle posteriorly

c Parietal plate with two denticles posteriorly.

fultoni maci omphalus a Shell not exceeding 6 mm • One upper and one basal palatal fold alanda. † A short horizontal fold above parietal plate tt Horizontal fold none minor. ** Only one basal palatal fold hanlevi 8 Shell 8-10 mm * Parietal plate gives off anteriorly a horizontal fold from upper extremity, one short horizontal fold below plectostoma ** No horizontal fold proceeding from parietal plate, two short horizontal folds below. affinus

II. Section CHERSZCIA, Gude (Second Section of Benson)

- Smistral or dextral. Umbilious wide. Palatal folds horizontal or oblique, sometimes with one oblique or vertical lamina

TYPE, P lecophie

Range From Assam through Upper Burms and Laos to Tenasserim

1 Dextral	
A Transverse parietal plate simple a Free horizontal parietal folds none a Palatal folds six	
* Connected by a transverse ridge, shell 27 mm ** Not connected, shell 24-26 mm.	ogler andersoni
β Palatal folds five, shell 11 mm	serica
γ Palatal folds seven with two denticles. b A free interrupted horizontal fold in front of parietal plate, palatal folds six, four inner united by a vertical ridge, seven denticles	laomoniana.
posteriorly	austeni
B Transverse parietal plate giving off anteriorly above a short horizontal fold, with a denticle below plate	••
Palatal folds six; shell 10-11 mm C Transverse parietal plate giving off anteriorly below	munipuzensis
a long horizontal fold. a With a median horizontal fold continuous to the	
peristome; shell 20 mm.	brachydiscus
b With a median horizontal fold interrupted, shell 16 mm	dextrorsa
2 Smetral	
A Parietal plate simple	
a Horizontal fold below transverse parietal plate,	
a No median fold	musprattı
β A long median fold present * A third short horizontal fold between upper	
and lower parietal folds † Palatal folds all horizontal, shell 10 mm.	pe arcta
†† Four palatal folds horizontal, two oblique;	7 anatamaeneis
9ncm 12 mm	Kenglungensis

††† Palatal folds, one vertical, rest horizontal. shell 75 mm shirotensis ** No third fold present nagaensis b Houzontal fold below transverse parietal plate long, joined to apertural ridge permeræ c Three short horizontal folds in front of transverse parietal plate, none below it 1 efuna B Transverse parietal plate giving off anteriorly below a short horizontal fold, a long median and a long lower fold present, joined to apertural ridge a Palatal folds all horizontal shanensıs b Palatal folds one oblique, rest horizontal lerophis. C Transverse panetal plate giving off anteriorly below a short horizontal fold, two short free horizontal folds above the latter, and a long one below joining the apertural ridge brahma

III Section Endoplon, Gude

Dextral Palatal folds horizontal, oblique, or almost vertical TYPE, P biachyplecta
Range Burma, Tonkin

Shell flattened

IV Section PLICTOPYLIS, s s Gude (Typical Section of Benson.)

Sinistial Shell flattened Palatal armature one vertical lamina with three horizontal folds above, one below

Type, P bensom Range Burma

A Two transverse parietal plates a Parietal plates parallel, upper horizontal palatal Shell less than 20 mm fold bisected a Median parietal fold truncate, not joined to ponsonby apertural ridge lissochlamys b Parietal plates divergent, upper horizontal palatal fold not bisected Shell more than 20 mm magna c Anterior parietal plate giving off a long horizontal fold above, and a A short one below, half the length of upper, woodthor per palatal folds in two series -B Lower fold one-quarter of the length of upper, leucochila palatal folds in one series Three transverse parietal plates feddeni

C,	Parietal plate ramified Shell acutely heeled Parietal fold trifurcate, a short horizontal fold near aperture	eyelasjnîs
Z	Shell not keeled Parietal fold trifurcate	
	a No horizontal fold below princtal plate, a free	
	interrupted horizontal fold in front	emrnn.
	B Parietal fold giving off autoriorly an interrupted horizontal fold, a short horizontal fold below	
	plate	Interce
	y. Parietal fold giving off anteriorly a continuous fold	4
		l arenomini
	• Shell thick	(
	† Upper arm of parietal fold longest, lower horizontal fold united to apertural ridge	терегеняч
	## Lower arm longest, lower horizontal fold not united to apertural ridge	
	5 Whorls much flattened, ambilious very	
	aliallow	สทฐนเกส
	§§ Whorls has finitened, unfinious deeper.	bensom

I. Section Expothera. Gude

Endothyra, Gude, Science Gossip, v 8 vi, 1899, p 148

Sinistral Umbilicus moderate Palatal folds horizontal or oblique

Typr, Helia (Plectopylis) plectostoma, Benson Range Sikkim, Assain, Burma

77. Plectopylis minor, Godiein-Austen

Helir (Pleetopplis) minor, Godwin-Austen, A. M. N. II. ser 5, is, 1879, p. 164, ibid, J. A. S. B. Ixiv, 1895, pl. 7, fig. 3 (shell and animal)

? Helix (Plectopylie) macromphalus, var minor, Blanford, J.A.S.B. xxxix, 1870, p. 18

Plectopylis miner, Gude, Science Gossip, & S 11, 1897, p 11, fig 47 (shell and armature)

Plectopylia (Endothyra) minor, Gude, op cit 11, 1899, p 148

Original description —"Shell sinistral, openly umbilicated, discoidal, lineaute Sculpture coarse, with inregular transverse ribbing, colour pale umber, with regularly disposed broadish transverse bars of sienna brown, spire flat, only the first three whorls slightly riging above the others, suture shallow Whorls 5, subangular on the periphery of the last, which has four distinct rows of short hairs, entire at the point Aperture oblique, slightly descending, peristome lumate, slightly flattened on the upper outer margin, but very little reflected, the inner margins connected with a distinct ridge on the parietal side.

"The parietal vertical lamina is simple, with no distinct horizontal plica below it, as in macromphalus, the palatal plice are six in front, four behind, the basal one in front thin and longer than the others." (Godwin-Austen.)

Diam maj. 5, minor 4 millim, alt 25 millim.

Hab Sikkim Darjeeling (Nevill, Stoliczka, Hungerford); Rungun Valley (Blanford), India: Naga Hills (Beddome); Laisen

Peak, Munipur (Godwin-Austen).

Lt-Col Godwin-Austen, in describing the present species, expresses the opinion that it is doubtless the form minor of P. macromphalus alluded to by Blanford in J. A. S. B 1870, p. 18.

The parietal armature consists of a strong vertical plate, a little deflexed below anteriorly, having posteriorly two minute denticles,

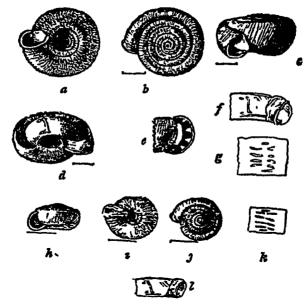


Fig 27 -Plectopylis minor.

one above and one below A very thin, free horizontal fold occurs below the vertical plate, revolving as far as the parietal ridge at the aperture, where it becomes much attenuated (see fig. 27f); this fold appears to be somewhat variable, for in a specimen in Mr. Ponsonby's collection, shown in fig 27l, it is very short, and scarcely extends beyond the vertical plate; while in another specimen, also in Mr Ponsonby's collection, shown in fig 27d, it is absent altogether. Lt.-Col. Godwin-Austen, in his description of the species, states "Parietal vertical lamina simple, with no distinct horizontal place below it."

The palatal armature is in two series, the anterior series consists of four thin horizontal folds, and the posterior series of six horizontal folds, the first of which is very minute, the next four a little broader and shorter than those of the anterior series, the fourth or fifth a little deflexed posteriorly, and the sixth very small and thin (see fig 27 g). The specimen shown in figs. 27 a-e is in Mr Ponsonby's collection, the one depicted in figs 27 f and a is in my own collection, while that delineated in figs 27 h-1 also belongs to Mr Ponsonby, who informs me that it was obtained from Mr. Hungerford, labelled P. plectostoma from Sikkim immature specimen in my collection, with four whorls completed. has the armature near the end of the fourth whorl and, except being smaller, identical with that of a mature shell. A specimen in the late Col Beddome's collection, from the Naga Hills, labelled with the MS. name P. minuta, Bedd, I also refer to the present species: it is, however, a little smaller, measuring only 4 millim in diameter. it is also a little more raised in the spire, and is more shining and darker.

78. Plectopylis hanleyi, Godwin-Austen.

Helix (Piectopylis) hanleys, Godwin-Austen, A. M. N. H. ser 5, iv, 1879, p. 164
Piectopylis hanleys, Gude, Science Gossip, N. S. v., 1899, p. 240

Plectopylis (Endothyra) hanleys, Gude, op cit. vi, 1899, p. 148

Original description — "Shell sinistral, depressedly conoid, openly umbilicated, probably hirsute when young. Sculpture coarse, irregular, transverse ridges. Colour uniform ochraceous. Spire conoidal; apex blunt, smooth. Suture well marked. Whorls six, close-wound, convex; aperture semicircular, diagonal, peristome somewhat thickened, white, with a thin callus on the parietal margin [wall (?)] not to the extent of a ridge.

"Major diameter, 55, minor diameter, 5; altitude, 3 millim.

"Parietal vertical lamina simple; palatal plice in two rows,

four long in front, four short behind, and one basal long

"This shell is very distinct, it has somewhat the form of *P. plectostoma*, but is not so angular on the periphery, while the internal plication is quite different, besides being so much smaller in size" (Godwin-Austen)

Hab. Sikkim?

No figure of this shell has been published, and the only specimen known was in the collection of the late Sylvanus Hanley. My endeavours to trace its whereabouts have proved unsuccessful.

79. Plectopylis blanda, Gude.

Plectopylis blanda, Gude, Science Gossip, N s iv, 1898, p 264, fig 70; ibid Journ Malac vii, 1899, p. 34, fig 11.

78 HELICIDÆ.

Plectopylis (Endothyra) blanda, Gude, Science Gossip, N s vi, 1899, p 148

Original description - "Shell sinistral, depressed conical, widely and deeply umbilicated, whitish-corneous, finely and regularly Spire conical, apex prominent, suture distinctly im-Whorls 6, tumid above, rounded below, increasing very messed. slowly and regularly, the last not descending in front, angulated above the periphery and around the wide perspective umbilicus. The cuticle is produced into deciduous hairs on the ribs, forming spiral rows Aperture oblique, lunate, a little flattened on the upper, outer margin Peristome white, a little thickened and reflexed, the margins united by a slight, flexuous ridge on the Parietal wall with a strong, vertical plate, slightly parietal callus deflected anteriorly and having two minute denticles posteriorly. the upper elongated vertically, the lower horizontally A very thin horizontal fold occurs below the vertical plate and a very

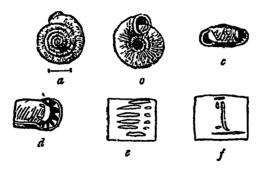


Fig 28 -Plettopylis blanda

short fold above it Palatal folds in two series, the anterior consisting of six thin horizontal folds, the first and sixth a little shorter and placed a little further back than the other four, the posterior series consists of four very short folds or denticles

"Major diam 6, minor 5 millim, alt 3 millim, (Gude)

Hab Assam Naga Hills

Differs from P. minor in being larger and more elevated, and in having a wider and deeper umbilicus. The parietal armature differs in having an additional fold above the vertical plate, and the anterior denticles are almost united to this fold. The palatal armature differs in the posterior folds being very short and almost reduced to denticles. Fig 28 d gives the posterior view of the two armatures, ϵ shows the inside of the outer wall with the folds and denticles, and f a portion of the parietal wall with the plates, folds, and denticles in situ. All the figures are enlarged

80 Plectopylis macromphalus, Blanford.

IIelax (Plectopylis) macromphalus, Blanford, J A S B. xxxx, 1870, p 17, pl 3, hg 14, Godwin-Austen, P. Z S 1874, pl 73, fig 1 (armature).

Helx macromphalus, Hanley & Theobald, Conch. Ind. 1874, pl. 83, figs 8-10, Nevill, Hand List, 1, 1878, p. 71, Tryon, Man. Conch. ser 2, 11, 1887, p. 160, pl. 34, figs 65-68

Plectopylis macromphalus, Pilsbry, ibid ix, 1894, p 146, Gude, Science Gossip, n s iv, 1897, p 10, fig 46 (armsture)
Plectopylis (Endothyra) macromphalus, Gude, op cit vi, 1899, p 148

Original description:—"Testa simistrorsa, late umbilicata, depressa, discoi lea, tenuiuscula, pallido-cornea, superne plicis arcuatis obliquis incrementi et liris spiralibus decussata, ad peripheriam et subtus fere lævis, striatula; striis nonnullis spiralibus circa umbilicum aliquando distinguendis, spira plana; apice vix emergente; sutura leviter impressa. Anfr. 4½-5½ planulati, arcte voluti; ultimus vix latior, supra peripheriam sub-augulatus, ad latus atque subtus convexus, antice leviter descendens. Apertura irregulariter lunaris, superne compressa, diagonalis; peristoma albido-labiatum, parum incrassatum, reflexiusculum, marginibus convergentibus,



Fig 29 -Plectopylis macromphalus

callo tenui junctis, externo supra peripheriam arcuato Plicatio interna persimilis ei Helicis pinacis et H plectostomatis; e lamina unica parietali, verticali et plica tenui longuiscula basali, atque plicis 5 palatalibus. basali tenui simplici, ceteris duplicibus, constans

"Diam maj 62, min 52, alt 23 mm" (Blanford.)

Hab. Assam: Mairung, Khasi Hills (Godwin-Austen); Daffa

Hills (Godwin-Austen); Naga Hills (Chennell).

The parietal armature (see fig 29 a) consists of a strong vertical plate, which has a minute, slightly elongated, horizontal denticle posteriorly to its lower extremity. The palatal armature is in two series (see fig 29 b, which shows the inside of the outer wall) The anterior series is composed of four short, broad, flattened, straight horizontal folds. The posterior series consists of six narrow horizontal folds, which are shorter than those of the anterior series; the fourth and fifth are a little obliquely depressed posteriorly. The specimen is in Mr. Ponsonby's collection, and measures 6 millimetres in diameter. Two specimens in my collection also measure 6 millimetres in diameter.

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81. Plectopylis sowerby1, Gude.

Plectopylis sowerby, Gude, Science Gossip, N s v. 1899, p 239, fig 98 (shell and armature)
Plectopylis (Endothyra) sowerby, Gude, op cit vi, 1899, p. 148

Original description — "Shell sinistral, widely umbilicated, discoid, dark corneous, regularly ribbed and indiately distantly plaited, strongly decussated above by spiral ribs, less distinctly so below. Whorls six, narrow, increasing slowly and regularly, somewhat flattened above and rounded below, the last not descending in front. Six or seven spiral ridges, probably, when fresh, bearing rows of hairs, pass round the whole of the bodywhorl, the first just above the slightly angular periphery, the others below it. Aperture ear-shaped; peristome slightly tinted with rosy-pink, scarcely thickened, and a little reflexed, the upper outer margin a little depressed, parietal callus slight,

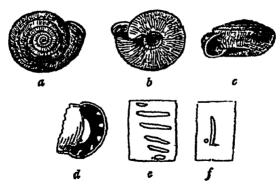


Fig 30 -Ptectopylis sowerbyn

without raised ridge at the aperture. Umbilious deep and wide. The parietal armature consists of a strong vertical plate, provided at its lower extremity with a short support anteriorly, and a small denticle posteriorly. The palatal armature is composed of six more or less horizontal folds, the first very slight and short, near the suture, the four next longer and more elevated, a little deflexed posteriorly, the sixth slight and very short." (Gude)

Major diam 7-9, minor 6 25-7 5 mill, alt 3 75-4 75 mill Hab Assam Khasi Hills

P sowerby is closely allied to P plectostoma, from which it can at once be distinguished by the following characters it is flatter, being less laised in the spire, the umbilicus is more open, there are only six whorls, the last not descending in front, the peristome is scarcely thickened and not much reflexed, and there is no raised ridge on the parietal callus. In the armature there are also important differences—the vertical parietal plate in P plectostoma gives off from its upper extremity anteriorly a horizontal

fold, which is absent in P. sowerby, where the plate in question 15 only provided with a support anteriorly and a denticle posteriorly below, and there is no horizontal fold below it; so that in this respect the present species differs from both its allies (see ing. 30 f, which shows part of the parietal wall with its armature) The palatal armature is in one series, and consists of six horizontal folds. The first fold is very short and slight; the second longest; the third, fourth, and fifth each a little shorter than its predecessor, the sixth slight and very short (see fig 30 c, which shows the inside of the outer wall with its folds). All the figures are enlarged

82 Plectopylis plectostoma, Benson.

Helia plectostoma, Benson, J. A. S. B. v. 1836, p. 351, Reeve, Conch. Icon. vii, 1852, pl. 129, fig. 782, Pfeisfer, Conch. Cab., Heliceen, i, 1846, p. 367, pl. 64, figs. 19-21, Nevill, Hand List, 1878, i, p. 71, Hanley & Theobald, Conch. Ind. 1870, pl. 13, fig 2

Helir (Plectopylis) plectostoma, Benson, A. M. N. II. ser 3, v, 1860, p. 247, Blauford, J. A. S. B. xxxiv, 1865, p. 194, Godwin-

Austen, P Z S 1874, p 612, pl 73, fig 2 (armsture)

Helix (Atopa (Piectopylis)) plectostoma, Tryon, Man Conch ser 2, ni, 1887, p 160, pl 34 figs 69, 70

Plectopylis plectostoma, Gude, Science Gossip, N 8 11. 1897. p 274, fig 39

Plectopylis (Endothyra) plectostoma, Gude, op cit vi, 1899, p 148

Original description -"T. 1eversa, depresso-conoidea, subtus tumida, spira exsertiuscula; anfr. 5 supra planati, radiatim plicati, rugis transversis decussati, ultimus angulatus; angulo subtus marginato, apertura lunata, plica (ut in H personata) interdum inconspicua, ultimo apfractui adhærente, umbilicus profundus. anfractus plerosque exhibens" (Benson)

Diam, maj 9, mm. 8; alt 4.5 mm.

Hab India. Naga Hills (Chennell), Dafia Hills, Khasi Hills Burma Arakan Hills (Kurz): Tongoop (Godwin-Austen) (Ingram); Bassein, Pegu (Blanford); Sylhet (Nevill)

Danieling (Blanford, Stoliczka, Mainicaring)

A careful scrutiny of a number of shells in various collections revealed the fact that two different forms, one with and one without a horizontal fold given off from the parietal vertical plate, have been included under P plectostoma, and it became therefore necessary to decide which of the two conformed to Benson's type in the Museum of Zoology at Cambridge In 1897, through the kindness of Dr. S F. Harmer, then in charge of the Museum, 1 was able to examine the type specimens, one of which I figured in 'Science Gossip,' and which is now reproduced Benson's reference to the armature in his amended description (1860), "lamina 1 parietali verticali, simplici, lamellis nullis munita," inclined me to conjecture that the form without the 82 HELICIDÆ

horizontal fold was the true *P plectostoma*, the examination of the types did not bear out this view. All the shells of the Benson collection labelled Darjeeling, which are without doubt the types of the species, belong to the form with the horizontal fold, and this form must, therefore, be taken as the true *P plectostoma*. The inspection of a large series of the two forms enabled me to obtain a fairly accurate idea as to the constancy of both forms and to draw up an amended description, which is now reproduced

Shell sinistral, disk-shaped, more or less dark corneous brown, opaque, with a conical spire, deeply but somewhat narrowly umbilicated, it is composed of seven narrow, closely and regularly coiled whorls, which increase slowly and are a little iounded above and below; the last whorl scarcely widens near the aperture and shortly descends in front. The shell is radiately plicate and granulated by coarse spiral sculpture above, and decussated below, while the cuticle is thick and distinctly raised into distant transverse plaits. Five lines of scattered hairs, placed on raised ridges, pass round the whole length of the body-whorl, the first on the periphery, the second a little below it, the third, fourth, and fifth wider apart, the last being close to the umbilical angulation

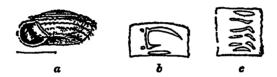


Fig. 31.—Plectopylis plectostoma

The aperture is broadly ear-shaped; the peristome is whitish or rufous, thickened and reflexed, the upper margin widely arcuate, the raised ridge of the parietal callus is scarcely curved, and not perceptibly separated from the margins of the peristome parietal armature consists of a strong vertical plate which gives off anteriorly a strong, obliquely ascending support below and a horizontal fold above, slightly notched at the junction; on the posterior side of the plate are found two minute denticles, one near the upper and one near the lower extremity. A single, very The palatal short, free horizontal fold is found below the plate armature consists of first, a thin, short, horizontal fold close to the suture; secondly, a thin but longer and broader fold opposite the upper extremity of the vertical parietal plate, slightly indented in the middle, with the posterior extremity shortly reflected at an angle of 100°; thirdly, a similar shortly reflected horizontal fold, notched in the middle, and then suddenly deflected vertically; fourthly, a short, thin, broad fold, which has posteriorly to it an almost vertically deflected short broad fold, fifthly, a similar short horizontal fold, which has also posteriorly a short, broad,

descending fold, a little more oblique than the previous one; and sixthly, a very short and narrow horizontal fold near the lower suture, situate below the space between the two preceding series Fig 31 a is from one of the type specimens; it measures, major diameter, 9 millimetres, minor diameter, 8 millimetres, axis, 5 millimetres. Two other of these specimens measure 85 millimetres, and one 8 millimetres in diameter. Fig 31 b, showing the parietal wall with its armature by itself, and fig 31 c, showing the inside of the outer wall with its palatal folds, are from a specimen in my collection, from the Khasi Hilis; it measures—major diameter, 8.5, minor diameter, 7.25; axis, 4.5 millim. The specimens of this form range from 8 to 9 millimetres in diameter.

Vor tricarinata, Gude

Plectopylis plectostoma, var. tricarinata, Gude, Science Gessip, N s in, 1897, p 275, ibid, Journ Malac. vi, 1897, p 45, fig 2

Differs from the type in being larger and more conical, in having the periphery acutely keeled, and in having three raised ridges between the periphery and the suture, revolving as far as the fourth whorl

Diam major 10, minor 9 mm; axis 6 mm

Hab Bengal (Benson); Khasi Hills (H. F Blanford)

This variety is based on two specimens from the Benson collection, labelled Bengal The shell is shown enlarged in



Fig 32 -Plectopylis plectostoma, var tricarinata

fig 32 a, while a portion of the last whorl, more enlarged, is depicted in fig 32 b. The Blanford collection—now in the British Museum—also contains a specimen collected in the Khasi Hills by the late H F Blanford.

Var exserta, Gude.

Plectopylis plectostoma, var eiserta, Gude, Journ Malac viii, 1901, p 49, fig. 5

Differs from the type in the peripheral keel being exserted. The shell is also larger and more solid. More than thirty specimens were received from a native collector.

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Diam major 105, minor 9.75 mm, alt 7 mm

Hab Assam Khasi Hills

Fig. 33 d shows the outline of the spire enlarged

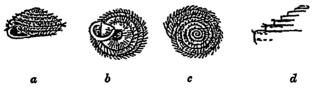


Fig 33 -Plectopylis plectostoma, var exseria

83 Plectopylis affinis, Gude

Plectopylis affinis, Gude, Science Gossip, N s 111, 1897, p 276, fig 41 (shell and armature)
Plectopylis (Endothyra) affinis, Gude, op cit. vi, 1899, p 148

Original description - "Shell sinistral, somewhat widely umbilicated, disk-shaped, pale yellowish corneous, translucent, radiately plicate, decussated by spiral lines above, smoother and shining below Whorls 7, narrow, increasing slowly, the last widening towards the aperture, and descending a little in front, rounded above, flattened below; four lines of soft pilose hairs pass round the whole length of the body-whorl, the first on the angulated periphery, the second a little below it, the third midway between the second and fourth, which is near the umbilicus. Aperture ear-shaped, elongated vertically, peristome white, thickened and reflexed, upper margin a little depressed, the raised flexuous ridge on the parietal callus is separated from the margins by a slight notch Umbilious deep and moderately wide The parietal armature consists of a vertical plate with two short supports anteriorly, one above and one below, and two elongated denticles posteriorly, one above and one below, two free, short, horizontal folds in a line occur below the vertical plate The palatal armature is composed of six folds, the first and sixth short, thin and horizontal, the others longer and broader; the second a little indented in the middle, with the posterior termination raised obliquely, the third is notched in the middle, and deflects obliquely posteriorly, the fourth and fifth are in two series separated by a short space, the anterior portion straight and horizontal, the posterior portion crescent-shaped and obliquely descending" (Gude)

Diam major 10, min 9 mm; alt 55 mm

Hab Assam . Khasi Hills

Plectopylis affinis had previously been confused with P. plectostoma It differs in being larger and much paler in colour, in having four instead of five rows of hairs, which are not placed on raised ridges as in that species; the cuticle is much thinner and not plaited, while the spiral sculpture is less coarse above and scarcely perceptible below, where the shell is also more shining than in *P plectostoma* It is translucent and the armature is distinctly visible through its wall, while the aperture is more narrowed laterally and the upper margin of the peristome is less arcuate, being a little inflected. The umbilicus is also wider and scarcely angulated, while the base is much more flattened. The ridge of the parietal callus is more raised and more curved. The parietal armature consists of a vertical plate with a very short support anteriorly at the upper and lower extremities, but without the horizontal fold above as in *P plectostoma*. The two denticles

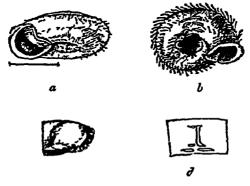


Fig 34 - Plectopylis affinis

on the posterior side are larger and more elongated, and below the vertical plate are two short, thin, horizontal folds in a line with each other (see fig. 34 d, which shows the parietal wall by itself, and fig 34c, which shows both armatures from the posterior The palatal armature is similar to that of P plectostoma, but the posterior portions of the third, fourth, and fifth folds. instead of being straight and almost vertical, are crescent-shaped and oblique (see fig 34 b, which shows the palatal folds as they appear through the shell-wall), an additional semi-circular fold, posterior to, but a little above, the fifth fold, occurs in this shell, this, however, I have not observed in any of the other specimens Fig 34 a shows the entire shell enlarged specimens were obtained from Mr Fulton some years ago, the twenty-five further specimens from the same locality, sent to me for inspection by him, range from 9 to 11 millimetres in diameter. Two immature specimens in my collection are composed of five and a half whorls; one of these has the immature barriers complete, but the palatal folds are very short and the posterior oblique portions of the fourth and fifth folds are almost straight instead of crescent-shaped, externally a slight trace of previous folds can be discerned, in the other specimen the last immature folds are similar to those of the first specimen, but the remains of a previous set are in a less advanced stage of disintegration.

84 Plectopylis pinacis, Benson

Heliu pinacis, Benson, A. M. N. H. ser 3, in, 1859, p. 268, Hanley & Theobald, Conch. Ind. 1870, pl. 13, fig. 5, 1874, pl. 84, figs. 1.4

Heliz (Plectopylis) pinacis, Benson, A. M. N. H. ser 3, v, 1860, p. 247, Godwin-Austen, P. Z. S. 1874, pl. 74, fig. 1 (armature), Nevill, Hand List, 1, 1878, p. 71, Godwin-Austen, J. A. S. B. xliv, 1875, pl. 7, fig. 2 (shell and animal)

Helir (Atopa (Plectopylis)) pinacis, Tryon, Man Conch ser. 2, iii,

1887, p 159, pl. 34, figs 53-55

Plectopylis pinacis, Pilsbry, Man Couch ser 2, 13, 1894, p 146, Gude, Science Gossip, N s in, 1897, p 206, fig 32 (shell and armature). Godwin-Austen, Moll India, 11, 1907, p 203, pl 114, fig 2 (anatomy).

Plectopylis (Endothyra) prinacis, Gude, Science Gossip, n 8 vi, 1890,

Helia (Corilla) pettos, Martens, Malak Blatt v., 1868, p 158 Helia pettos, Pfeisffer, Novit Conch ser 1, in, 1869, p 462, pl. 101, figs 7-9

Original description —"Testa sinistrorsa, late umbilicata, orbiculato-depressa, superne oblique scabre plicato-striata, liris confertis spiralibus, subtus striis obliquis flexuosis striisque spiralibus decussata, cornea, epidermide fusca, scabra (junioris ad carinam præsertim hispida) induta, spira planata, vix elevatiuscula, apice planato, sutura leviter impressa; anfiactibus 7½ planulatis, lente et arcte accrescentibus, ultimo antice breviter descendente, superne subcarinato, subtus valde convexo, circa umbilicum profundum, perspectivum, conicum, compressiusculo, apertura valde obliqua, lunari, peristomate expansiusculo, reflexo, albido, marginibus callo brevi, laminari, elevatiusculo, sinuato junctis

"Diam maj 14, min $12\frac{1}{2}$, axis $4\frac{1}{2}$ mill" (Benson)

Hab Sikkim Darjeeling (Blanford, Stoliczka, Mainwaring); Rungun, Pankabari (Blanford), Rungmaval (Blanford);

Damsang (Godwin-Austen)

Nevill was the first to suspect that Helia (Corilla) pettos was identical with Plectopylis pinacis. The type of the former, which is in the "Konigliche Museum tur Naturkunde," Berlin, was forwarded to me for inspection in 1897 by the late Dr. von Martens, with permission to open the shell for the purpose of examining its armature, which enabled me to satisfy myself that the two species were in fact identical, both as regards armature and shell characters

The parietal armature (fig. $35\,c$) consists of a single strong vertical plate, which is strongly abruptly deflected anteriorly at the lower extremity, and gives off posteriorly a club-shaped support, the upper extremity gives off two slight supports, one on either side, the posterior one horizontal, and the anterior one a little lower, oblique, and very short, a little below the posterior support occurs a small denticle, a free, thin horizontal fold is found below the vertical plate, see also fig. $35\,a$, which

shows the shell with a portion of the outer wall removed, exposing the parietal and palatal armatures from the anterior side, and fig 35 b, which shows the folds from the posterior side. The palatal armature consists of first, a thin horizontal fold near the suture, secondly, a stronger horizontal fold, deflected in the middle, thirdly and fourthly, two shorter, but stronger, equal and parallel folds descending obliquely; fifthly a crescent-shaped fold placed obliquely with the concave side facing the aperture (the lower surfaces of these folds are seen in fig 35 a, their upper

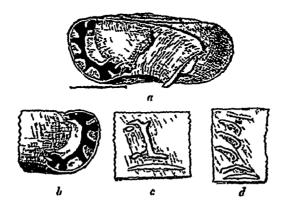


Fig 35 -Plectopylis pinacis

surfaces in fig. 35 b), sixthly, a smaller horizontal fold, which becomes attenuated posteriorly (see fig. 35 d); two minute, elongated denticles, one below the other, and placed at right angles to each other, occur between the first and second folds, near their posterior terminations. The specimen figured is from Darjeeling, and is in Mr. Ponsonby's collection, it measures 15 millimetres in diameter. A specimen in my collection, also from Darjeeling, measures 14 millimetres. Lt.-Col. Godwin-Austen's figure, quoted supra, shows a short free horizontal fold above the vertical parietal plate, no trace of this fold can be seen in either of the two specimens examined, neither does it occur in the specimen in the Berlin Museum

85 Plectopylis fultoni, Godwin-Austen

Helix (Plectopylis) fultom, Godwin-Austen, A M N H. ser 6, x, 1892, p 300

Plectopylis fultom, Pilsbry, Man Conch ser 2, ix, 1894, p 146, pl 40, figs 13-15 (shell), Gude, Science Gossip, N s iii, 1896, p 178, fig 23 (shell and armature)

Plectopylis (Endothyra) fultoni, Gude, op cit vi, 1899, p 148

Original description —" Shell sinistral, keeled, widely umbilicated, subglobosely discoidal, colour pale ochraceous; sculpture a 88 HELICIDÆ

fine close flaxy epidermal striation, with four lines of long bairs arranged upon the periphery of the body-whorl-two closely adjacent and running with the keel above, one around the umbilical depression, and one intermediate Spire depressedly convex, suture well marked apex rounded Whoils seven, closely wound, side of the last very oblique below and flattened, becoming rounder near the aporture, where it descends very slightly Aperture wide, semi-ovate, very oblique, and slightly reflected on the margin Peristome not thickened, continuous over the parietal side. The internal barriers are not visible on looking into the anerture The parietal vertical lamina is simple, with only a slight horizontal support above on the posterior side, a very short double-knobbed hourontal parietal lamella is situated immediately below it Palatal plica double, in two rows, the two apical or highest in position being united together by a low ridge, the posterior row are somewhat obliquely airanged" (Godwin-Austen)

Major diam 20, min 17.3 millim, alt axis 85 millim Hab Assam Khasi Hills

Plectopylis fullons is allied on the one hand to P anderson, the panietal armature being almost identical, while the arrangement and structure of the palatal folds-connect it on the other hand with P. plectostoma The parietal armature consists of a single strong vertical plate (see fig 36 a) Lt.-Col Godwin-Austen, in describing the armature, states that the parietal plate has only a slight horizontal support above on the posterior side; in specimens in my possession, however, this plate has a similar support below, these supports consist of a tooth united to the vertical



Fig 36 -Plectopylis fultom

plate by a slight callosity Below this is a short thin horizontal plate, a little indented in the middle. The palatal armature (see fig. 36 b) consists of first, a short horizontal fold, close to and parallel with the suture, secondly, a longer and stouter horizontal flexuous fold, thirdly, another horizontal fold, slightly indented in the middle and deflected posteriorly at an obtuse angle, fourthly and fifthly, two series each of two short horizontal folds, the anterior ones slightly oblique, with their lower ends towards the aperture, and the posterior ones deflected at an obtuse angle posteriorly, and sixthly, near the base, a short slightly bent fold, with the convex side turned towards the lower suture. The specimen figured, which is not quite mature, bears a second

vertical plate on the parietal wall (see fig. 36 a), which appears to be the remnant of the immature barriers formed before the completion of the shell. A young specimen in my collection, composed of five whorls, possesses the armature a little beyond the place where four and a half whorls have been completed, the barriers are almost identical with the mature ones, except that the folds are smaller and the second and third palatal folds are deeply bilobed. A still younger specimen of only four whorls have been completed.

II Section Chersæcia, Gude

Chersaecia, Gude, Science Goesip, A. S. vi, 1899, p. 148

Simistral or dextral Umbilicus wide. Palatal folds horizontal or oblique Sometimes with one oblique or vertical plate

TYPE, Helix lciophis, Benson

Range Assam, through Upper Burma and Laos to Tenasserim

86 Plectopylis muspratti, Gude

Pleclopylis muspratti, Gude, Science Gossip, N s iv, 1897, p 10, fig 45 (shell and armature), ibid, Journ Malac vii, 1898, p 7, bg 5

Plectopylis (Chersaecia) muspratti, Gude, Science Gossip, N. 8 vi, 1899, p. 149

Original description —"Shell sinistral, discoid, widely and leeply umbilicated, pale corneous, streaked transversely with dull

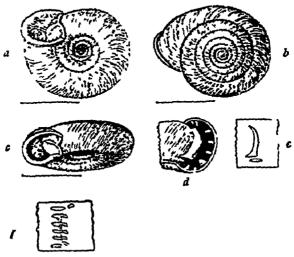


Fig 37 -Plectopylis muspratti

brown, finely stricted and decussated with spiral lines which are very distinct on the upper surface, but less so below Suture

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impressed, spire a little conical Whorls six and a half, scarcely convex, slowly increasing, the last widening towards the aperture. slightly angular above, descending suddenly in front, and a little constricted behind the peristome. Aperture roundly lunate, peristome white, thickened and reflexed, margins converging Parietal callus with a strongly raised flexuous ridge, which is separated from both maigins by a little notch. Umbilious wide and deep Parietal wall with a short entering flexuous fold united to the ridge at the aperture, becoming attenuated inwardly. and at one-third of the cucumference from the aperture, with a strong, crescent-shaped vertical plate, which is suddenly deflected posteriorly at the lower extremity; below this, on the anterior side, occurs a very short, horizontal fold Palatal folds six, horizontal, short, the first free, with a small denticle posteriorly. the second, third, fourth, and fifth connected with each other by a vertical ridge, which deflects below the fifth fold posteriorly and terminates in a small, oblique denticle, the sixth again free

"Major diam 13 mm, min 11 mm, alt 6 mm" (Gude

Hab Assam Naga Hills.

P muspratt somewhat resembles P nagaensis, but the armature is quite different. Fig 37 d gives the posterior view of the parietal and palatal armatures, while fig. 37 e exhibits the inner wall with the parietal folds, and fig 37 f the inside of the outer wall with the palatal armature.

87 Plectopylis austeni, Gude.

Plectopylis austem, Gude, Science Gossip, N & vi, 1899, p 15, fig 97 Plectopylis (Chersaecia) austeni, Gude, tom cit p. 148

Original description — "Shell sinistial, discoid, widely umbilicated, ochreous corneous, covered with a deciduous velvety cuticle, finely and closely ribbed, decussated by raised spiral lines, rather distant on the upper side. One of these spiral lines forms a ridge or keel on the upper angle of the whorls above the periphery, revolving above the suture as far as the third whorl Spire concave, apex a little raised, suture strongly impressed. Whorls 6½, flattened above, rounded below, obsoletely angulated around the umbilicus increasing slowly at first, the last widering rather suddenly, and descending half the width of the whorling front, aperture oblique, cordate. Peristome white, strongly thickened and reflexed, the margins united by a strong raised flexuous concave ridge, slightly notched at the junctions above and below. Umbilicus wide and rather shallow.

"Parietal armature consisting of a short median horizontal fold close to the apertural ridge, and a second, longer and tarther back, rather elevated posteriorly, gradually descending on the shell-wall anteriorly; below its posterior extremity occurs a small denticle, still farther back is found a strong vertical crescont-shaped plate, the upper and lower extremities of which are deflected

posteriorly.

"Palatal armature composed of any short horizontal folds, the first longest, near the suture, provided at its posterior extremity with an elongated dentiele; the second, third, fourth, and fifth a little obliquely depressed posteriorly where they are united by a slight vertical ridge, which is continued above the second and below the fifth folds, on the posterior side occur five elongated denticles, the four lower of which correspond to the four folds,

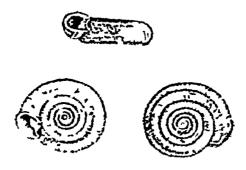


Fig. 38 -Plectorylis austens

while the fifth is situate near the upper extremity of the vertical ridge, the sixth fold is near the lower suture, and has also an elongated denticle posteriorly" (Gude)

Major diain 17 5-19, minor 14 75-16 5 mm; alt 5-6 mm.

Hab Assam Diyung Valley, Singpho (Ogle)
The present species is allied to P oglei, but can readily be distinguished by its concave spire, being besides much smaller and much more flattened. In its parietal armature it differs in having a short and a long median horizontal fold and a denticle in front of the vertical plate, all of which structures are absent in P ogle: A comparison of the figures will also reveal differences in the pilatal armatures of these two species

Plectopylis austeni has further, as regards palatal armature, some affinity with P musmatti, but the latter is dextral and the parietal armature is quite different, as is also the general shape

of the shell

An immature specimen, which accompanied the three adult ones from which the description was drawn up, his only 5% whorls completed, and is interesting from the fact that it possesses two sets of armature, a quarter of a whorl distant from each other; these differ considerably from the mature barriers, the parietal armature consisting of only the vertical plate and a very short, slight, horizontal fold in front of it, while the palatal armsture is similar to that of mature shells, except that the folds, ridge, and denticles are very small and slight

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88 Plectopylis oglei. Godwin-Austen

Hehr (Plectopylis) ogler, Godwin-Austen, J A S B xlvm, 1879. p 3, pl 1, ing 2 (shell and parietal aimatine)

Helia (Atopa (Plectopylis)) oglei, Tryon, Man Conch sei 2, in,

1887, p 159, pl 36, ings 29-31

Plectopylis oglei, Pilsbry, Man Conch sei 2, 13, 1894, p 146, Gude, Science Gossip, N s iv, 1898, p 263, fig 68 (shell and armature) Plectonylis (Chersaecia) ogler, Gude, op cit vi, 1899, p 148

Original description .- "Shell dextral, widely umbilicated, subdiscord, dull pale brown with close-set sienna markings crossing the Epidermis thick and nacreous, and somewhat rough Apex flat but slightly concave, the whorls rising regularly Whorls 8, the last descends slightly near the aperture, which is very oblique and ovate Peristome slightly reflected, white, continuous on the body-whorl, but not strongly developed Palatal

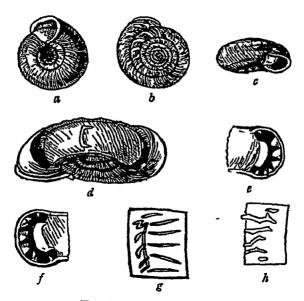


Fig 39 —Plectopylis oglei.

teeth 6, 3rd, 4th, and 5th equal, 6th longer, double parietal side is one single vertical lamina with buttress-like supports on posterior side above and below " (Godwin-Austen).

Major diam 27, minor 25 mm, alt 8 mm

Hab Assam Sadıya (Ogle)

The parietal armature consists of a single strong vertical plate, which gives off posteriorly two short ridges, one at the upper and one at the lower extremity (see fig. 39 d, which gives an enlarged view of a specimen with the outer wall removed) armature consists of six horizontal folds the first, near the suture, very short and thin, the second, third, fourth, fifth, and

sixth bilobed or bisected about the middle, where a slight vertical ridge connects their posterior portions, the posterior portion of the second fold is sinuous, somewhat S-shaped, the third, fourth, and fifth are slightly deflected posteriorly, the sixth is very unequally bisected, the posterior portion being less than a third the length of the anterior portion, which is raised at first and then suddenly deflected (see fig 39 d, which shows the inside of the outer wall of the shell enlarged) The illustrations were made from the type specimens in the collection of Lt-Col. Godwin-Austen, who kindly lent them for examination Figs 39 e-a (enlarged), are taken from a specimen not quite full-grown, e shows the parietal and palatal armatures from the anterior side; f their posterior aspect, and g the inside of the outer wall with its folds. This specimen exhibits the remains of a previous parietal plate, one quarter of a whorl behind the permanent one Fig 39 h shows the inside of the outer shell-wall of the specimen depicted in fig 39 d, the armsture of which is incomplete, a portion having been broken away. Two immature specimens in different stages of growth exhibit armatures identical in all respects with those illustrated, except that the palatal folds are less bilobed

The species under consideration is allied to P serica, but it is larger, and presents considerable differences in the palatal

armature

89 Plectopylis serica, Godwin-Austen

Hehr (Plectopylis) serica, Godwin-Austen, P Z S 1874, p 608,

pl 73, fig 5 (shell and armature) Helix sericata, Hauley & Theobald, Conch Ind 1875, pl 132,

figs 8 9

Helia (Atona (Plectopylis)) serica, Tryon, Man Conch. ser 2, m,

1887, p 159, pl 34, figs 49-52

Plectopylis serica, Pilsbry, Man Conch ser 2, 1x, 1894, p 146, Gude,
Science Gossip, N s 111, 1897, p 205, fig 31 (shell and armature)

Plectopylis (Chersnecia) serica, Gude, op cit. vi, 1899, p 148

Original description - "Shell dextral, very openly umbilicated, discoid, pale horny brown, very flat above, with regular narrow oblique bands of brown crossing the whorls Epidermis thin The apex very slightly higher than the adjacent and outer whorls Whorls 7, narrow and closely wound, flat above, the last descending near the aperture, which is diagonal; outer margin circular, peristome white, reflected, continuous on the body-whorl or parietal margin. The palatal teeth, six in number, are situated rather more than one-third the circumference from the aperture, and, counting from above downwards, the first is very minute, the 4th, 5th, and 6th largest. On the parietal side of the whorl there is one single vertical lamina with short bifurcations or supports above and below " (Godwin-Austen)

Major diam 125, minor 11 mm, alt 4 mm

Hab. India Hengdan and Kopamedza Ridge, 5,000 ft, Burrail

94 ublicidæ

Range, Naga Hills (Godwin-Austen), North Cachar (H F.

Blanford)

Lt-Col Godwin-Austen records the fact that one of the several specimens he opened, for the purpose of examining the internal barriers, contained two vertical parietal lamellæ, a reduplication of structure to which he thinks is clearly due the more compound forms of the plicæ and lamellæ in the Burmese species I am inclined to think, however, that the second lamella to which he refers must be the remains of an earlier set of barriers as I have so frequently observed in other species, these earlier sets being gradually absorbed after the completion of the later sets. He states that it is essentially a forest species, found among dead leaves and moss

The parietal armature consists of a single vertical plate, which descends a little obliquely towards the aperture; the upper extremity gives off on both sides a very short support, and at the



Fig 40 -- Platopylis serica

lower extremity, also on both sides, a stronger support, the anterior one being a little lower than the posterior one (see The palatal armature consists of five more or less oblique horizontal folds; the first is longest, flexuous, and descends a little posteriorly, the second is horizontal, and bifurcates posteriorly, the upper arm straight, the lower descending obliquely, the third, shorter, at first proceeding horizontally, about the middle deflecting obliquely at an angle of about 100 degrees, the fourth is a little longer, ascends a little at first and then deflects posteriorly at an angle of 90 degrees; the fifth is shortest, horizontal, near the lower suture and parallel to it (see fig 40 b, which shows the armatures, parietal and palatal, from the posterior side, and fig 40 c, which shows the inside of the outer wall, with its palatal folds, all the figures are enlarged) Lt-Col Godwin-Austeu (op cat p 608) mentions six palatal folds, and his figure shows a small one near the upper suture, of which, however, no trace is found in the specimen now figured, which is from Shiroifurar, and is in Mr Ponsonby's collection, it measures 11 millimetres in diameter

90 Plectopylis munipurensis, Godwin-Austen.

Heli: (Plectopylis) munipui ensis, Godwin-Austen, P Z S 1874, p 610, pl 73, fig 6 (shell and armature)

Heli: (Atopa (Plectopylis)) munipui ensis, Tryon, Man Conchiser 2, ni, 1887, p 160, pl. 34, figs 56-58

Plectopylis munipurensis, Pilsbry, Man Conch ser 2, 1x, 1894, p 146, Gude, Science Gossip, x s 1v, 1898, p 263, fig 69 (shell and armature)

Plectopylis (Chersaecia) munipurensis, Gude, op cit vi, 1899, p 148

Original description—" Shell dextral, openly umbilicated, turnidly discoid, thick, pale ochry-brown, with distant spots of colour on the upper surface. Umbilicus open and deep. Spire very depressedly conoid, suture shallow. Whorls 7, flat, the last narrowly constricted just behind the aperture and descending very slightly. At the upper and outer margin of the aperture is a slight compression giving a waved outline to the lip. Aperture very oblique, semicircular; peristome slightly reflected, white, a low narrow, curvilinear ridge joining the margins. The parietal vertical lamina is situated one-third of the circumference from the mouth, having an attached anterior short horizontal process equal to its length, short supports on the posterior

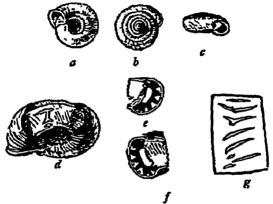


Fig 41 -Plectopylis munipureness

extremity and curving slightly forwards on the lower Palatal teeth 7, the first and upper minute, the second, third, fourth, and fifth horizontal, the second being the longest, sixth minute, seventh rather lengthened, horizontal, backed by a single isolated small tooth" (Godwin-Austen)

Major diam 10 5-11, minor 9-9 5 mm; alt 5 mm

Hab Burma. Ihang Valley, Munipur (Godwin-Austen).

Hab Burma. Ihang Valley, Munipur (Godwin-Austen). The parietal armature consists of a single, strong, vertical plate, which is obliquely deflected towards the aperture, it has two slight supports posteriorly—the lower a little deflected, the upper obliquely raised—and gives off anteriorly, at the upper extremity, a long, slightly raised ridge; a minute denticle occurs just below the vertical plate (see fig 41d, which gives an enlarged view of the shell with a portion of the outer wall removed). The palatal armature consists of six more or less horizontal folds the first very minute near the suture; the second long and lescending a little obliquely towards the middle, with the posterior end suddenly raised, the third and fourth also descending a little

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obliquely, their posterior extremities dilated, almost bifurcated; the fifth also descending a little, its posterior termination suddenly deflected, the sixth, horizontal, with a minute denticle above, and an elongated one a little farther back, below the posterior termination of the fold (see fig. 41 g, which shows the inside of the outer wall of the shell) The figures are from the type specimens in the collection of Lt-Col. Godwin-Austen, who obligingly lent them to me for this purpose.

Figs 41 a-c are of natural size, while figs 41 d-g are enlarged, c shows the armatures from the anterior and f from the posterior side, while g exhibits the inside of the outer shell-wall with the

palatal barriers in situ

91 Plectopylis nagaensis, Godwin-Austen.

Hehr (Plectopylis) nagaensis, Godwin-Austen, P Z S 1874, p 609, pl 73, fig 4 (armature)

Helix (Atopa (Plectopylis)) nagaensis, Tryon, Man Conch ser 2,

111, 1887, p 161, pl 35, figs 78, 79

Plectopylis nagaensis, Pilsbry, Man Conch ser 2, 1x, 1894, p 146, Gude, Science Gossip, x s 111, 1897, p 206, fig 33 (shell and armature)

Plectopylis (Chersaecia) nagaensis, Gude, op. cit vi, 1899, p 148

Original description — "Shell sinistral, widely umbilicated, discoid, dull ochry-brown, epidermis thick and coarsely striste; above depressedly pyramidal. Whorls 7, flat, narrow, and those near apex closely wound, the last very descending near mouth Aperture diagonal, broadly lunular, outer margin well rounded,

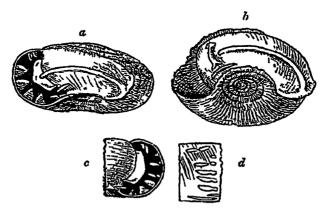


Fig 42 —Plectopylis nagacusis

peristome very thick, white, reflected A thick ridge on the parietal side, separated by slight indentations, connects the inner margins; and from the middle of this runs back a long horizontal lamella, terminating close to, but not connected with, the single vertical lamina, this is thick and bifurcate below, tapering above and curving backwards, a short free lamella is

situated immediately under it Palatal plice 6, horizontal, the first and upper small, the remainder about equal in size

"Major diam 12, minor 11 mm; alt 6 mm" (Godwin-Austen)

Hab. India. Prowi, head of the Lauier River, Naga Hills,

A dwarfed variety is mentioned by Lt-Col Godwin-Austen, 1 c p 610, from Sikhami, on the lowest part of the main watershed of the Burrail, measuring only major diam. 8, minor 6.75 mm; alt. 3 mm

The parietal armature consists of a strong vertical plate, a little deflected posteriorly at the lower extremity, where it terminates in a short strong ridge, it also has a short support a little higher up on the anterior side, and another short ridge on the posterior side at the upper extremity. Below this plate is a free thin horizontal fold, and a little above the middle of the plate, a short distance from it, rises a strong horizontal plate, which runs parallel with the whorl, and descends a little at the aperture, where it is united with the raised ridge of the parietal callus (see fig 42 a and b, which show the shell with part of the outer wall removed)

The palatal armature consists of. first, a tuin bilobed horizontal fold near the upper suture, secondly, a stronger horizontal fold, with a small denticle at its posterior termination (between these two folds, in a line with their posterior terminations, occurs a minute denticle); thirdly, a horizontal fold, descending a little posteriorly, where it is slightly notiched; fourthly, a similar horizontal fold deflected posteriorly at first, then slightly raised and notiched; fifthly, a shorter but stronger horizontal fold with the posterior end more strongly deflected, and also slightly notiched, sixthly, a thinner but longer horizontal fold near the lower suture, attenuated anteriorly (see fig 42 d, which shows the inner side of the outer shell-wall with its palatal folds)

Between the posterior terminations of the fifth and sixth folds occurs a very slight thin fold extending much further posteriorly than the main folds; this may prove not to be constant; it is not mentioned by Lt-Col. Godwin-Austen in his description. The specimen figured is in Mr Ponsonby's collection, and, measures major diam 11.5, minor, 10 mm; alt 55 mm

92 Plectopylis kengtungensis, Gude

Plectopylis (Chersæcia) Lengtungensis, Gude, Proc. Malac Soc London, xi, 1914, p 54, with text-figure

Original description — "Shell sinistral, widely umbilicated, discoid, corneous Whorls 64, narrow, increasing slowly and regularly, somewhat flattened above, rounded below, the last abruptly and shortly descending in front and slightly dilated at the mouth. Spire a little raised, suture impressed. Aperture obovate, peristome slightly thickened and reflected, upper margin nearly straight, outer rounded, columellar ascending; parietal

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callus with a raised flexuous ridge slightly notched at the junctions above and below.

"Parietal armature (fig. 43 b) composed of a vertical plate, deflexed posteriorly above, with a short obliquely ascending ridge below, projecting on both sides, a long horizontal fold rises a short distance from the vertical plate, running parallel with the whorl and joining the raised ridge at the aperture; below this occurs a second, but very short fold, 2 mm long, also rising close to the vertical plate and in a line with its lower extremity, below the vertical plate runs a third, but very thin and slight horizontal fold close to the lower suture and joining the ridge at the aperture. The palatal armature (fig. 43 a) consists of first, a thin bilobed horizontal fold near the upper suture, next, two horizontal rather thin elevated folds, followed by two stouter and rather less elevated folds, obliquely ascending towards the mouth, and lastly, a thin horizontal fold near the lower suture,

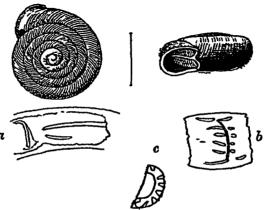


Fig 43 -Plectopylis Longtungensis (From Proc Malae Soc. London)

longer than the others and gradually attenuated anteriorly, all except the first fold, are provided posteriorly with a slight denticle, while a low transverse ridge unites their posterior terminations. Fig 43 c gives the posterior view of the parietal and palatal barriers " (Gude.)

Major diam 12, minor 10, alt 4.75 mm. Hab E Burma Kengtung (Woodthorpe)

Three specimens in the Godwin-Austen collection, British Museum, were found upon examination to be closely allied to *P nagaencis*, G.-A. The new species, however, is more depressed and lacks the spiral sculpture of its ally which also has the barriers placed nearer the aperture, and the third, fourth, and fifth palatal folds more oblique, while *lengtungensis* possesses a short horizontal median fold which is absent in nagaensis. It also resembles *P. muspratti*, Gude, in having the palatal folds united posteriorly by a low ridge and in having the barriers at the same distance from the aperture, but in the latter species the palatal folds are much shorter and stouter and it lacks the long horizontal parietal fold as well as the short median fold, being only provided with a short fold at the aperture

93 Plectopylis lecophis, Benson

Helix (Plectopylis) lciophis, Benson, A M N H ser 3, v, 1860, p 246, Blanford, J A S. B xxxiv, 1865, p 94, Godwin-Austen, P Z S 1874, pl 74, fig 2 (shell and armature), Tryon, Struct Conch in, 1884, p 33, pl 94, fig 25

Helix (Atopa (Plectopylis)) leiophis, Tryon, Man Conch ser. 2, in, 1887, p 163, pl 35, figs 88, 89

Plectopylis leiophis, Pilsbry, Man Conch ser 2, ix, 1894, p 145, Gude, Science Gossin, x & x 1808 p 16, 578 (shell and demonstrate)

Pleclopylis leiophis, Filsbry, Man Conch ser 2,1x, 1894, p. 145, Gude, Science Gossip, N. S. v., 1898, p. 16, fig. 76 (shell and drmature)

Plectopylis (Chersaecia) leiophis, Gude, op. cit. vi, 1899, p. 148

Helix refuga, Pfeisfer in Philippi, Abb Beschr. Conchyl in, 1847,

Helix, p. 2, pl. 10, fig. 4, ibid, Conch-Cab, Helicen, i, 1848,

p. 383, pl. 66, figs. 21-23, Reeve, Conch. Icon. vii, 1852, pl. 82,

ing. 436, Theobald, J. A. B. B. xxvi, 1857, p. 249, Hanley & Theobald, Conch Ind 1870, pl 13, fig 8 (non Gould)

Helix (Piectopylis) pseudophie (Blanford), Godwin-Austen, P Z S

1874, p 610, pl 74, fig 3 (shell and armature)

Helix (Atopa (Picciopylis)) pseudophis, Tryon, Man Conch ser. 2, 111,

1887, p 162, pl. 35, figs 80, 81

Plectopylis pseudoplus, Pilabry, Man Conch ser 2, ix, 1894, p 146;

Gude, Science Gossip, n s iv, 1897, p 170, fig 62 (shell and armature), v, 1898, p 17, fig 77 (armature)

Plectopylis letophis (=pseudophis), Gude, Proc Malac Soc. London,

vm. 1908. p. 88

Original description :- "Testa sinistrorsa, late et profunde umbilicata, subdiscoidea, superno planata, interdum omilino plana vix solidula, oblique et arcuntim rugoso-striata, lineis nonnullis spiralibus decussata, sub epidermide scabra, fusco-cornea, albida: spiræ apice vix elevatiusculo lævigato, sutura impressa, anfractibus 53-63 angustis, ultimo supra peripheriam angulato, antice valde deflexo, basi rotundata, apertura valde obliqua subhorizontali, lunari, peristomate reflexo albido, marginibus lamina sinuosa elevata, medio lamellam profunde intrantem, usque ad januam attingentem emittente junctis. Janua pliciformi fauciali prima remota, lamina I parietali verticali simplici forti lamellam aperturalem valde elongatam superne emittente, infra eam lamellis duabus brevibus (a lamina spatio brevi separatis) munita, plicis 6 palatalibus intrantibus, quinta robustiore obliqua

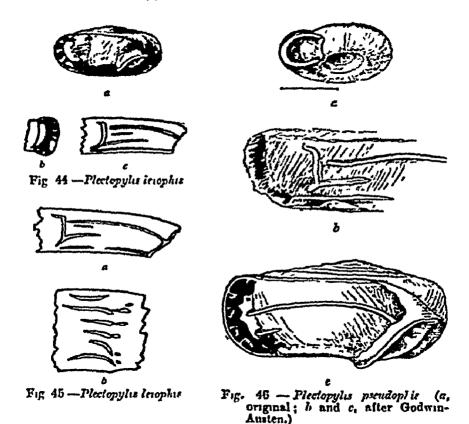
"Diam major 11-14, minor 8-11 5, alt. 3-6 mill." (Benson.) Kwadouk, Thyet-Myo (Benson); Akoutoung Hab Burma

(Blanford)

Lt-Col. Godwin-Austen stated (P. Z S 1875, p. 44) that P lesophis was identical with Gould's Helix refuga, basing this identification on the specimens in the British Museum, so labelled Upon comparing the latter with Benson's type by Cuming specimens, obligingly lent to me in 1898 by Dr. S F. Harmer, then in charge of the University Museum of Zoology, Cambridge, I found they were indeed identical, but the specimens in the British Museum had been wrongly identified by Cuming and They formed the subject of the illustrations purporting to represent H 1 efuga in Philippi's work, quoted above, in Reeve's Conch Icon, and in Conch-Cab All these figures must, therefore, be referred to P. leiophis

Lt.-Col Godwin-Austen in 1874 described and figured Plectopuls pseudophis which he considered to be allied to P peracta. evidently overlooking its close relationship with *P. leiophis*, as pointed out by me in 1897 and 1898 when I investigated these The principal points of difference alleged between the two supposed species appear to be the following in P leuphis the parietal vertical plate is rounded in outline, in pseudophis it is toothed, in the former the lower parietal horizontal fold is continuous, in the latter it is interrupted, leiophis has a very short horizontal fold between the long upper and the shorter lower parietal fold, a feature lacking in pseudophis; while, lastly, the latter was said to be more elevated in the spire. I was at first inclined to regard these differences as specifically valid, more especially as I had not been able to examine the barriers of P pseudophis when dealing with that species in 1897, and had to rely upon Lt -Col Godwin-Austen's figure. In 1898 the Rev. Ashington Bullen, since deceased, favoured me with a specimen which accorded with P pseudophis in every respect except that it had an additional short fold between the long upper and the shorter lower horizontal parietal fold, resembling levophis in that feature, but, as I pointed out at the time, this character appeared to be inconstant in that species. In 1908, however, I received three specimens of Plectopylis from Mr. Robert Cairns, which at first I was inclined to regard as an undescribed form intermediate between the two species. This led me carefully to examine once more all the specimens of lejophis in my collection, which had considerably increased since first I studied these structures This examination proved to me conclusively that the features differentiating the two alleged species are inconstant, for while some specimeus have the elevated spire and the toothed outline of the vertical lamina of P. pseudophis, and possess the short fold between the two other horizontal folds, stated to characterize P lewphis, others, again, have a depressed spire, although the vertical lamina is toothed in a varying degree, being entire in some palatal armature is identical in all the specimens examined appears, therefore, that no constant character differentiates P lenophis and P. pseudophis and the two must consequently be united under one name. Fig 46a represents a specimen, labelled pseudophis, in the British Museum, while figs 46 b and c are copied from Godwin-Austen's original figures The shell drawn in fig. 44 a is in Mr. Ponsonby's collection, showing the anterior view of the two armatures, b represents the posterior aspect of these, while c shows the parietal wall with its vertical lamina and Finally figs 45 a and b exhibit the parietal horizontal folds and palatal armatures respectively of the shell I received from the late Rev Ashington Bullen, which I had referred to P pseudophrs.

The armature of *P. lerophis* may now be described as follows— The parietal barriers comprise: a strong vertical lamina, toothed or entire, angular above, where it gives off posteriorly an abruptly. descending short ridge, while below it deflects obliquely and gives off on the anterior side a comparatively short horizontal fold, a long free horizontal fold rises close to the vertical plate, a little below its upper extremity, revolving parallel with the whorl as far as the aperture, when it unites with the ridge on the parietal callus; between these two folds sometimes occurs a very short, free, horizontal fold; (one immature specimen in my collection possesses in addition an elongated denticle between this short fold and the long upper fold). A very thin, free, horizontal fold



rises below the vertical plate, running close to the lower suture and terminating near the apertural ridge.

The palatal armature consists of first, a short thin horizontal fold near the suture; secondly, a longer horizontal fold, somewhat deflected posteriorly, with an additional short wedge-like fold attached to it, which has posteriorly, a little above it, a small denticle; thirdly, a shorter horizontal fold widened towards the posterior extremity, then suddenly attenuated and indented, and finally again widened a little; fourthly, a short, slightly curved horizontal fold, descending a little posteriorly, also slightly

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attenuated and indented near the posterior extremity; fifthly, a crescent-shaped, sub-vertical fold (the concave side being towards the aperture and the lower suture), with a small denticle near its posterior extremity, and sixthly, a longer curved horizontal fold, having its upper edge reflected towards the fifth fold, and possessing a small denticle near its posterior extremity.

94 Plectopylis refuga, Gould

Helix refuga, Gould, Proc Boston Soc Nat Hist 11, 1846, p 99

Helix (Corilla) rufuga, Gould, Otia Conch 1862, p 198

Plectopylis refuga, Blanford, British Burma Gazetteer, 1, 1879, p 709, Gude, Science Gossip, N. s v, 1898, p. 15, fig 75 (shell and armature)

Plectopylis (Chei saecia) refuga, Gude, op cit vi, 1899, p 148.

Original description —"Testa sinistrorsa, discoidea, supra plana, infra concava, viridi-cornea: anfr 6 arcte volutis, confertim striatis, ultimo prope aperturam deflexo, sutura impressa, apertura perobliqua, subcordiformi, peristomate albo, reflexo, callo sinuoso connexo; fauce lamella alba, flexuosa, ad anfractum penultimum volvente.

"Diam. $\frac{3}{5}$ [=15 25 mm]; alt. $\frac{1}{7}$ pall [=5 mm.]" (Gould) Hab Burma Tavoy (Gould); Tenasserim, Pegu (Blanford)

Plectopylis refuga has long been confused with P. laophis and the two were by most authors regarded as identical. This confusion arose from the fact that the figures, purporting to represent the former, given by Philippi, Pfeiffer, and Reeve, were based on the specimens in the Cuming collection, now in the British Museum, and, as I have already stated when discussing P leophis, wrongly identified as P refuga by Reeve and Pfeiffer, as careful comparison with Benson's types has proved to me. The short description given of the species by Gould might apply equally well to several distinct shells and is insufficient to enable us to determine which form he had before him

The type specimens of this and two other species of *Plectopylis* described by Gould—repercussa and anguna—being in the possession of the New York State Museum, I requested the loan of them in 1898, but the Trustees decided not to let the specimens go out of the country—Dr Merrill, the Director of the Museum, however, very obligingly had the shells photographed and their armature sketched for me, and these were reproduced in 'Science Gossip' at the time, the same figures doing service on the present occasion—Dr Bagg, Dr Merrill's assistant, kindly communicated the following notes concerning P refuga

"Helix refuga, Gould, catalogue number, 271, original number, A, 562 Two earliest volutions smooth, remainder of shell very finely striated and hairy. Outer volution on lower side angular Greater diameter nearly $\frac{3}{4}$ inch [=19 mm], smaller diameter, $\frac{9}{16}$ inch [=14 mm.]; alt $\frac{5}{32}$ inch [=4 mm]; length of horizontal

fold at aperture, 12 inch [=5 mm.] Basal denticle [1.6. vertical

parietal plate | cup-shaped "

A discrepancy occurs between the measurements originally given by Gould and those supplied by Dr. Bagg; as the diameter indicated by the former, however, agrees with that of the photographs, allowance being made for their enlargement, Gould's measurements must, I think, be accepted as correct.

From figs 47 d and e, which have been copied from Dr. Bagg's sketches, it appears that the parietal armature consists of a strong vertical plate which is concave posteriorly, on the posterior

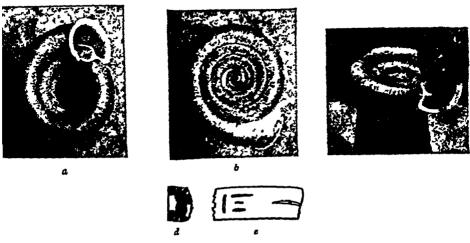


Fig 47 —Plectopylis refuga

side there are three short horizontal folds, the upper longest, the median shortest, a short horizontal fold at the aperture is united to the flexuous ridge (see fig 47 c, which shows the parietal wall); while the palatal armature appears to consist of six folds the first three short and horizontal; the fourth strong, vertical, slightly indented about the middle; the fifth and sixth horizontal and thin (see fig. 47 d, which gives the posterior aspect of both armatures). Figs. 47 a-c are reproduced from the photographs of the type specimens, enlarged two diameters.

95 Plectopylis perrieræ, Gude.

Plectopylis perrierae, Gude, Science Gossip, N s iv, 1898, p 231, ing 67 (shell and armature), ibid, Journ. Malac vii, 1898, p 14, fig 10
Plectopylis (Chersaecia) perrierae, Gude, Science Gossip, N s. vi,

1899, p 148

Original description:—" Shell sinistral, discoid, widely and deeply umbilicated, pale corneous, very finely and regularly striated, and decussated by spiral lines Suture slightly impressed, spire

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flattened, apex a little raised. Whorls six to seven, increasing slowly and regularly, flattened above, rounded below, the last angulated above the periphery and round the umbilicus, and descending shortly and abruptly in front. Aperture heart-shaped; peristome white, scarcely thickened, a little reflected, the margins united by an elevated sinuous ridge on the parietal callus, notched at the lower junction. Umbilicus wide and deep. Parietal wall with a thin vertical plate, strongly deflected posteriorly below, and giving off a short horizontal ridge at the upper extremity on each side; a long horizontal flexuous fold rises close to the upper extremity of this plate on the anterior side, descending suddenly at first, then ascending gradually, and afterwards gradually descending, following the deflection of the last whorl, becoming united to the ridge at the aperture, a second, shorter, horizontal fold occurs below this one, rising close to the



Fig. 48 -Plectopylis perriera.

lower extremity of the vertical plate, proceeding horizontally at first, and then ascending a little, another very thin fold rises below the vertical plate, running parallel to the lower suture as far as the aperture, where it unites with the ridge. Palatal folds, five; the first, rather long and thin, near to and parallel with the suture, with a deep indentation near the posterior extremity, dividing it into two unequal parts; the second, horizontal, a little deflected posteriorly, with an elongated denticle posteriorly, and a second, smaller, one above the first, the third fold much shorter, strongly curved downwards posteriorly, with a minute denticle posteriorly, the fourth fold vertical with an obliquely descending ridge posteriorly at the upper extremity, and bifurcated at the lower extremity, the anterior arm of the bifurcation the shorter, a minute denticle occurs near the ridge at the upper extremity and a second one near the middle, both on the posterior side, the fifth fold is thin, horizontal, and strongly deflected on both aides" (Gude)

Major diam. 15. minor 12 mm.; alt. 5 mm.

Hab Burma: Thyet-Myo, Pegu; Kyengdwen Valley, N.W.

Burma (Ogle).

In contour this species resembles *Plectopylis perarcta*, but the shell is much larger. The parietal armature further connects it with the species just named, but the palatal armature is more like

that of P lenophus

The specimen figured, and one in the late Miss Linter's collection, have the measurements given in the diagnosis, but my second specimen measures only 125 millimetres in diameter. Figs 48 a-c show the shell in three different aspects, natural size; figs 48 d-f are enlarged; d shows the parietal and palatal armatures from the posterior side, f, the inside of the outer wall with the palatal folds and denticles; and e, the parietal wall with its plate and folds

Two specimens collected by Ogle, in the Godwin-Austen

collection, now in the British Museum, I refer to this species

96. Plectopylis shirotensis, Godwin-Austen

Helix (Piectopylis) shiroiensis, Godwin-Austen, P Z S 1874, p 609, pl 78, fig 3 (shell and armature)

Helia shironensis, Hanley & Theobald, Conch Ind 1875, pl 159,

fig 7.

Helix (Alopa (Plectopylis)) shiroiensis, Tryon, Man Conch. ser 2,

m, 1887, p 163, pl. 35, fig 90

Plectopylis sharotensis, Pilshry, Man Conch ser 2, 1x, 1894, p 145, Gude, Science Gossip, N s 111, 1896, p 155, fig 20 (shell and armature), tom cut p 204

Plectopylis (Chersaccia) shiroiensis, Gude, op cit vi, 1899, p 148

Original description — "Shell sinistral, openly umbilicated, discordal, thin, light brown, very finely striated. Apex flatly convex; suture slightly impressed, umbilious open and deep Whorls 6, the last rounded, sharply compressed on the lower part behind the aperture and descending to it Aperture broadly lunate, very oblique; peristoine white, continuous, reflected. From the centre of the parietal ridge completing the peristome a lamella runs up that side of the whorl for three-sevenths of the circumference towards the parietal plication, but does not join it; and here a short free horizontal lamella hes parallel to and below it. The parietal vertical lamina is simple, with one short support at the lower anterior end, and below this is another, free, narrow, horizontal lamella Palatal teeth consist of 4, that are horizontal; the 4th is long, narrow, and curving inwards. Between the 3rd and 4th is a vertical double-notched tooth, evidently a compound and representative of two very oblique plice" (Godwin-Austen)

Major diam 8, minor 7 inm ; alt. 4 mm Hab. India: Shiroifurar, N.E. of Munipur.

P. shrowns is allied to P perarcta, and is likewise sinistral but the shell is smaller, it is more raised in the spire and the last whorl is deflected in front. There are also differences in the armsture.

of the parietal barriers the principal horizontal lamella is more flexuous, being somewhat raised towards the vertical plate as well as towards the aperture before its final deflection at its junction with the parietal callus; it is also much broader. The second horizontal plate is likewise broader and flexuous, while both are a little further distant from the vertical plate (see fig. 49 a). The vertical plate is smaller and is rounded at its upper extremity. while it is not deflected posteriorly below, as is the case in perarcia. There are, besides, two small very short ridges given off from the extremities of the vertical plate on its posterior side, and the third horizontal is a little longer, as well as more flexuous. The chief difference, however, is in the palatal barriers, as may be seen on reference to figs 49 b-d The first fold is horizontal, small, and bilobed, close to the suture, then come two horizontal folds.



Fig 49 -Plectopylis shirorensis

small but comparatively broad, next a broad and strong vertical bilobed lamella, giving off on the posterior side two short ridges from the base of the lobes, and finally below this a small but broad horizontal fold with a small denticle a little above and posterior to Fig 49 b shows the barriers from the side of the aperture and fig. 49 d from behind The specimen figured is in Mr. Ponsonby's collection.

97 Plectopylis perarcta, Blanford.

Helix (Plectopylis) perarcta, Blanford, J. A S B xxxiv, 1865, p 75, Godwin-Austen, P Z S 1874, pl. 74, fig 4 (shell and armature),

ıbıd, op cıt 1888, p 243.

Helia per arcta, Pfersser, p. 243.

Helia per arcta, Pfersser, Novit. Conch ser 1, iii, 1869, p. 502, pl. 108, fgs. 13-15, Hanley & Theobald, Conch Ind. 1870, pl. 13, fig. 3.

Helia (Atopa (Plectopylis)) perarcta, Tryon, Man. Conch ser. 2, iii, 1887, p. 162, pl. 35, figs. 91-95.

Plectopylis per arcta, Pilsbry, Man. Conch ser. 2, ix, 1894, p. 146; Gude, Science Gossip, N. S. iii, 1896, p. 155, fig. 19.

Plestopylis (Chersseria) perarcta, Gude, on cit. vi. 1899, p. 148.

Plectopylis (Chersaecia) perarcta, Gude, op cit vi, 1899, p 148

Original description —"Shell sinistral, widely umbilicated, discord, rather thin, white, transversely sinuously striated, with faintly marked decussating spiral lines above and below. Apex minutely granulate, slightly raised above the flat spire, suture rather deeply impressed. Whorls 6, convex above and at the periphery, the last a little compressed behind the mouth, descending suddenly to the aperture, which is oblique and roundly lunate; peristome white, expanded all round; margins joined by a somewhat curved ridge, from the centre of which a lamella runs up the whorl towards the parietal plication, which, however, it does not join. The parietal vertical lamina is single, simple, rather short, slightly curved, with a rudimentary transverse plait at the top. Two free horizontal lamellæ occur beneath that running to the aperture, the lowest being the longest and thinnest, and running back beneath the base of the vertical lamina. Palatal teeth 6, all horizontal except the 4th and 5th, which are slightly oblique. Umbilicus open, deep, exposing all the whorls

"Major diam 11, minor 9 inm., alt 4 mm" (Blanford.)
Hab Upper Burma Mya Leit Doung, near Ava (Blanford),

Hlindet (Spratt, Coll Ponsonby)

The specimen here figured is in Mr Ponsonby's collection and measures 10 millim. in diameter. The parietal armature is composed of a broad vertical plate, augulated above, but gradually decreasing towards the base, where it is also slightly deflected posteriorly. A horizontal lamella rises anteriorly about its middle, very close to it, yet distinctly separate (see fig. 50 a), proceeding parallel to the whork, deflecting with it towards the aperture and joining the raised flexuous bilobed ridge of the parietal callus, which is separate from the peristome (see fig. 50 c). Another horizontal but very short lamella, below the principal one, also rises close to the vertical plate, a short free horizontal lamella is



Fig 50 -Plectopylis perarcta.

seen below the vertical plate, but it does not pass beyond it posteriorly (see fig 50 a; this third horizontal lamella is also shown sideways in figs. 50 b and c) Lt-Col. Godwin-Austen, in comparing the present species with Plectopylis pseudophis [now shown to be synonymous with P. leiophis], states that the horizontal lamella is not continuous, and it is shown to be interrupted in his figure (Proc Zool Soc 1874, p 609, pl 74, f. 4), and again, in describing Plectopylis brachydiscus (Journ. Asiat Soc. Bengal, xlviii (1879), p 2), he informs us that that species resembles P perarcta in this respect. The specimen here figured, however, has the principal horizontal lamella continuous, a fact which induced me at first to doubt the specific identity of the shell

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figured by me with P perarcta, but as the second horizontal lamella is joined to the vertical plate in P pseudophis, and in my specimen this lamella is quite free, as stated to be the case in P. perarcta, it is evident that my shell is not P pseudophis; moreover. Mr Blanford, in describing the shell, states that from the centre of the curved ridge at the aperture, "a lamella runs up the whorl towards the parietal plication" It may, therefore, safely be assumed that in the type specimen the horizontal lamella is not interrupted, and the question arises whether the shell figured by Lt-Col Godwin-Austen was perfect in having the horizontal plate interrupted in the manner described The palatal armature is simple, and consists of four short, somewhat strong horizontal folds, equidistant and parallel, with a smaller one above, close to the suture, and two small ones in a line with each other below, also near the suture (see figs. 50 b and c, the former figure showing the posterior, and the latter the anterior ends of the folds, of the two bottom folds only one is visible in either figure)

98. Plectopylis brachydiscus. Godwin-Austen

Helix (Plectopylis) brachydiscus, Godwin-Austen, J. A. S. B. xlviii,

1879, p 2, pl 1, fig 1 (shell and parietal armature)

Helix (Atopa (Plectopylis)) in achydiscus, Tryon, Man Conch. ser. 2,

11, 1887, p 162, pl 36, figs 32-34

Plectopylis brachydiscus, Pilsbry, Man Conch ser 2, 1x, 1894, p. 146; Gude, Science Gossip, N s in, 1896, p 154, fig 18 (shell and armature)

Plectopylis (Chersaecus) bi achydiscus, Gude, op cit vi, 1899, p 148

Original description: -- "Shell dextral, umbilious very open and shallow, very discoid, rather strong, dull umber-brown, epidermis thick with a cloth-like texture, finely and beautifully ribbed longitudinally; in young fresh shells the upper outer margin is closely set with a strong regular epidermal fringe about 075 inches long Spire quite flat, approaching the concave in some specimens, the apex itself having a subpapillate form Whorls 7, the last rather flat on the side and angular above, descending at the aperture, which is very oblique and oblate Peristome strongly reflected thickened, white, the margins connected by a well raised ridge; notched above and below. A long horizontal lamella is given off from the upper middle portion of this towards the vertical parietal lamina, but only extends for 0 20 inches, then terminates, but at ·15 inches is again developed, becoming thicker and higher as it approaches the vertical lamina and ending just short of it, in this respect being similar to P perarcta.

"The parietal vertical lamina is pointed above and gives off from the lower basal end a short lamella towards the aperture, and a very slight short thin, free lamina is to be seen just below the vertical barriers Palatal teeth simple, six, the 2nd, 3rd, 4th, and 5th are the best developed, the 1st and last are small, 2nd the

longest " (Godwin-Austen.)

Major diam. 21-24, minor 17-21 5 mm.; alt 6-7 mm

Hab Lower Burma Mule-it range, east of Moulmain

(Limborg).

The shell forming the subject of the present illustration is in Mr Ponsonby's collection and, being old and weatherworn, does not possess the marginal fringe of hairs referred to and shown in Godwin-Austen's figure

The parietal callus has a strong, raised, flexuous ridge, separated from the peristome by a notch above and below, and has, in addition, about the middle a free lamella, 3 millim long (see fig. 51 a) The parietal armature further consists of a broad, vertical plate, angulated above, and giving off at its lower end,

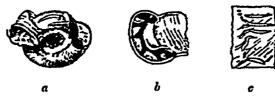


Fig. 51 - Plectopylis brachydiscus

towards the aperture, a horizontal plate, 4 millimetres long, which slopes abruptly towards the parietal wall and gradually loses itself. while on the posterior side there is a very short ridge abruptly sloping obliquely downwards (see figs 51 a and b); about the middle of the vertical plate a free horizontal plate occurs, about 7 millimetres long, separated from the vertical plate by a distance of 1 millimetre, decreasing in height as it approaches the aperture, and then suddenly terminating (see fig. 51 a). The palatal armsture is very curious (see fig 51 c, which shows it in situ), and consists of six folds, the first straight and horizontal; the second also straight and horizontal, but with a small bifurcation at the posterior end; the third partly horizontal and deflecting posteriorly at an obtuse angle, the fourth very short horizontally, descending vertically for a short distance and then deflecting posteriorly, the fifth very short, flexuous, and nearly vertical, while, finally, the sixth is again almost horizontal. A little below, and to the left of the sixth fold is a small tooth, while above, posteriorly to the first fold, and almost in a line with the bifurcation of the second fold, are three minute teeth

In looking through the British Museum collection I came across two immature specimens, which are of interest from the fact that the armature differs in some important particulars from the mature type. The parietal vertical plate in these specimens is sinuous in outline at the upper part, and at its lower extremity gives off anteriorly a horizontal fold 3 mm. long, which slopes abruptly and slightly ascends the parietal wall towards the upper suture; on the posterior side it is furnished with a short ridge; a very short horizontal fold occurs between this vertical plate and

the lower suture The free horizontal plate has not yet been formed About 3 mm behind the vertical parietal plate is found the remnant of a previous barrier, almost absorbed The palatal folds are similar to those of mature specimens, but the second is not highereste

99 Plectopylis dextrorsa, Benson.

Helix (Plectopylis) refuga, van dextronsa, Benson, A. M. N. H. ser 3, v, 1860, p. 4

Helix refuga, van dextronsa, Hanley & Theobald, Conch. Ind. 1870, pl. 13, fig. 9

Helix (Atopa (Plectopylis)) refuga, van dertronsa, Tryon, Man Conch. ser 2, 111, 1887, p. 164, pl. 35, fig. 2

Helix (Plectopylis) dextronsa, Godwin-Austen, P. Z. S. 1875, p. 44

Plectopylis dextrorsa, Pilsbry, Man Conch. ser 2, 1x, 1894, p. 145, Gude, Science Gossip, N. S. 111, 1896, p. 156, fig. 21

Plectopylis (Chersaecia) dextrorsa, Gude, op. cit. vi. 1899, p. 148

Original description — "Janua phenformi fauciali prima remota, lamina 1 parietali magna verticali simplice antice lamellam 1 inferiorem elongatiusculam emittente, lamella superiore valde elongata aperturæ laminam parietalem non omnino attingente, plica basali obsoleta, plicis palatalibus intrantibus 6, tribus superioribus et basali elongatis sinuosis, quarta et quinta brevibus, postice plicis obliquis distinctis munitis." (Benson)

Major diam 17, minor 14 mm, alt 5 mm

Hab Lower Burma Phye-than, Tenasserim Valley (Benson). Originally described by Benson as a variety of P. refuga, it was raised to specific rank by Lt-Col. Godwin-Austen in 1875, who stated that it was very close to P pseudophis [=leiophis], but his

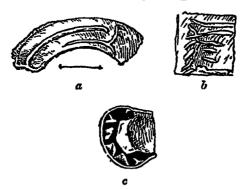


Fig 52 -Plectopylis dextrorsa

figure of that species—copied ante p 101, fig 46—does not bear out this view, and after careful comparison I came to consider its nearest ally to be *P. brachydiscus*. The shell, however, is smaller than in that species, measuring 16 millim. in diameter, and there

are important differences in the armsture of the two. In the present species the parietal vertical plate is rounded at the top and forms a short ridge posteriorly, while another much smaller ridge is formed at the base, first proceeding a little horizontally and then becoming deflected towards the lower suture (see fig 52a); the principal horizontal fold begins at a little distance from the vertical plate as in P. brachydiscus, but it is placed above the middle and therefore nearer the upper suture than in that species, and instead of revolving parallel with the suture, it bends upwards a little and proceeds without interruption as far as its junction with the raised ridge of the parietal callus (see fig. 52a) at the aperture, whereas in its ally this is interrupted Differences in the palatal armature will be observed on reference to fig 52 b. where the inner side of the shell-wall bearing the folds and denticles is shown. The first fold is long and horizontal, the second is also horizontal and bifurcates as in the other species. next come two series of three folds each, the anterior ones horizontal, the nosterior ones smaller and descending obliquely, and lastly we find a strong broad dentitle parallel with and near to the lower suture, with a smaller one posteriorly in a line with it Fig. 52 c shows the barriers—parietal and palatal—from the posterior side. All the figures are based on a specimen in Mr Ponsonby's collection The Benson collection in the University Museum of Zoology, Cambridge, contains four specimens of P. dextroisa, they measure 17 mm in diameter.

100. Plectopylis shanensis, Stoliczka

Plectopylis shanensis, Stoliczka, J. A. S. B. xlii, 1873, p. 170

Helix (Plectopylis) shanensis, Hanley & Theobald, Conch. Ind. 1875, pl. 149, figs. 8, 9 (shell), Nevill, Hand List, 1, 1878, p. 71 (shawensis)

Helix (Atopa (Plectopylis)) shanensis, Tryon, Man. Conch. ser. 2, 111, 1887, p. 162, pl. 36, figs. 10, 11

Helix (Plectopylis) trilamellaris, Godwin-Austen, P. Z. S. 1875, p. 43

Plectopylis shanensis, Pilsbry, Man. Conch. ser. 2, 1x, 1894, p. 146, Gude, Science Gossip, N. S. 1v, 1897, p. 36, fig. 48, vi, 1899, p. 77, fig. 105 (shell and armature)

Plectopylis (Chersaecia) shanensis, Gude, op. cit. vii, 1899, p. 148

Original description — "PI testa planorbulari, pallide fusca, apice minutissime exserto, pallido; anfractibus 6½, augustis, sutura indistincte marginata junctis, primis 2½ ad tribus minute rugulosis, cæteris transversim oblique striatis atque concentrice obsolete striolatis, ultimo ad peripheriam subrotundato, infra paululum augustiore, ad aperturam modice deflexo, umbilico spatioso, anfractus omnes sutura distincte marginata separatos exhibente, apertura angulum circiter 55° attingentem cum axi formante, peristomate undique expansiusculo atque incrassato, margaritaceo lutescente, circumdata, ad utramque terminationem labii subangulati profunde incisa, labio plicis tribus distinctis instructo, plica

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mediana crassissima, ea atque infera multo tenuiore usque ad peristoma extensis, tertia interposita a margine remote evanescente, sed usque ad laminam internam verticalem, circiter tertiam partem unius circuitus a margine aperturali distantem extensa; ultimo anfractu intus supra laminam verticalem antice plicis sex crassiusculis, postice plicis decem brevioribus atque tenuioribus instructo

"Diam maj 21 5, min. 17, et 6 5 diam aut alt. aperturæ 7 5 mm. "Diam. spec. secundi minoris sunt 18 5, 15, 5 8, 6 6 mm."

(Stoliczka)

Hab Burma · Shan States (Stohczka); Kuengan, Pegu

(Theobald)

The two shells collected by Theobald, which were discovered by Godwin-Austen and Nevill in the Indian Museum, Calcutta, and described as a new species under the name of trilamellaris by Godwin-Austen, were subsequently found by him to be identical

with Stoliczka's species (J. A. S B. xlviii, 1879, p 2).

The parietal armature consists of a strong horizontal median fold, revolving over nearly half of the outer whorl, and united to the ridge at the aperture, but it is free posteriorly. A short distance beyond it occurs a strong vertical lunate plate, which is deflected posteriorly below, where it gives off a short support; on the anterior side of this vertical plate, also below, a strong horizontal fold is given off, extending a little over half the length of

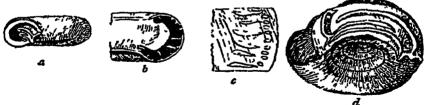


Fig 53 -Plectomilis shanensis

A third horizontal thin fold, close to the lower the median fold suture, commences just below the vertical plate, and is united to the ridge at the aperture (see fig 53 d, which shows the shell with the outer wall removed, and fig 53 b, which gives the posterior view of the parietal and palatal armature). All three horizontal folds are visible from the aperture as seen in fig. 53 α . The palatal armature is in two series: the anterior series consists of six thin horizontal subequal folds, while the posterior series is composed of nine short denticles arranged in a vertical row (see fig. 53 c which shows the inside of the outer wall) The specimen figured is in the British Museum, and measures—major diam 195 mm.; minor diam. 155 mm, alt. 6 mm.; it is from the A specimen in the McAndrew collection in the Shan States University Museum of Zoology, Cambridge, labelled Plectopylis repercussa, proved on examination to pertain to the species now under consideration. It measures—major diam 20 mm; minor diam. 15 mm., alt 6 mm.

101 Plectopylis brahma, Godwin-Austen.

Helix (Plectopylis) brahma, Godwin-Austen, J. A. S. B. xlviii, 1879, p. 3, pl. 1, hg. 3 (shell and armature)

Helix (Atopa (Plectopylis)) brahma, Tryon, Man Conch ser 2, 111,

1887, p 164, pl 36, figs 35-37

Plectopyles brahma, Pilsbry, Man Conch ser. 2, 1x, 1894, p 145, Gude, Science Gossip, N s iv, 1897, p 170, fig 63 (shell and armature).

Plectopylis (Chersaecia) brahma, Gude, op cit vi, 1899, p 148

Original description :—"Shell sinistral, rather closely umbilicated, discoidal, pale ochry-brown, finely and regularly striate Apex flat, yet slightly convex Whorls 7, last angular above and rounded below, slightly compressed behind the aperture and hardly descending Aperture lunate, oblique Peristome slightly reflected and thickened, white, continued as a callus on the body-whorl

"Internal structure complicated; the parietal vertical lamina is strong and gives off a short horizontal lamella at the lower end, above this are two other and parallel free lamellæ (in three cases out of twelve I examined, the upper lamella was united to the vertical barrier, but this does not affect the order of position and



Fig 54.—Plectopylis brahma

arrangement of all those processes in this species), both short, the lower being the best developed; the upper is occasionally united to the upper end of the vertical barrier. There is a very thin thread-like lower free lamella extending to the peristome and uniting with the parietal callus. The palatal place are arranged in two rows, those of the anterior row are few and large, four in number, the two upper long, narrow, and adjacent, the 3rd is a flattened dome-like mass, the 4th is long and curving inwards. Behind this at a short distance is the second row, consisting of fourteen very minute, closely arranged, thin, longer or shorter tooth-like processes, those on the upper side being slightly the largest" (Godwin-Austen.)

Major diam 9, minor 85 mm, alt. 5 mm

Hab Assam Brahmakhund (Ogle)

It-Col Godwin-Austen states that in external form the present species resembles *P* shirounsis, from which it may be distinguished by the coarser periostracum and more regular striation, while the last whorl is not constricted near the aperture. The parietal armature consists of a strong vertical plate having a short

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support posteriorly above and below, and giving off anteriorly at the lower extremity a short horizontal fold; above this are two free longer horizontal folds, the upper one rising close to the vertical plate, the lower one longer and rising a little further from the vertical fold. A minute denticle occurs between the second and third horizontal folds, and a horizontally elongated denticle above the upper extremity of the vertical fold; a very thin slight fold runs near to and parallel with the lower suture, uniting with the ridge at the aperture (see fig. 54c, which shows the parietal wall with its folds) The palatal armature is in two series, the anterior one consisting of four elongated horizontal folds, the second and third being separated by a wider space than the others, while the posterior series is composed of thirteen or fourteen minute denticles arranged close together, some a little The shell figured is in the British Museum. It measures—major diam. S. minor 65 mm; alt 4.5. mm.

102. Plectopylis andersoni, Blanford.

Helix (Piectopylis) andersoni, Blanford, P Z S 1869, p 448; Godwin-Austen, ibid. 1874, p 612, pl. 74, fig. 9 (armsture); Nevill in Anderson, Zool. Res. Two Exped. West. Yunnan, 1. 1878, p 876: Tapparone Canefri, Ann Mus. Civ Genova, ser. 2, vii. 1889, p 323 Helex andersoni, Hanley & Theobald, Conch Ind 1875, pl. 112

Heltr (Atopa (Piectopylis)) andersoni, Tryon, Man Conch ser 2, iii, 1887, p 161, pl. 34, fig 71, pl. 35, figs. 74-75

Plectopylis andersoni. Pilsbry, Man Conch. ser 2, ix, 1894, p 146; Gude, Science Gossip, x. s. iii, 1896, p 154, fig 17

Plectopylis (Cherececia) andersoni, Gude, op cit. vi, 1899, p 148.

Original description .—" Tests dextrorsa, latissime umbilicata, discordes, solidula, albida, epidermide crassula fusca, interdum ad peripheriam laciniatim fimbriata, induta, sub epidermide decussatostriats, lineis spiralibus supra distinctis, infra subobsoletis. Spira plana, apice vix prominente, sutura subimpressa. Anfr. 72-8, angusti, arcte convoluti, supra planulati, infra in umbilico convexiusculi, ultimus superne ad peripheriam angulatus, subtus tumidus et cırca umbilicum pervium, omnes anfractus monstrautem, obtuse compressus, pone aperturam leviter decendens, juxta Apertura perobliqua, rotundato-lunaris; peristoma constrictus peristoma album, undique expansum, superne ad extremam peripheriam leviter angulatim porrectum, margimbus lamella curvata, ad ambas extremitates incisa junctis, lamina intranti nulla. Janua interna remota, ad 1/3 anfractuum ab apertura sita, e plica unica verticali parietali, 4 pulatalibus horizontalibus, harum tribus inferioribus versus extremitates altioribus, medio humilibus, postice subbifidis, una basali etiam horizontali simplici constans

"Diam. maj. 26, min. 23, alt. 83 mill " (Blanford.) Hab Upper Burma Bhamo, Ava (Anderson, Fea); Yunnan: Hoetone (Anderson).

The shell is solid, disc-shaped, measuring 21 to 26 millimetres in diameter, of a light brown colour, with alternating streaks of a lighter shade on the upper surface. It is composed of eight whorls, distinctly ribbed above and below, and very regularly decusarted above by raised spiral lines reaching as far as the apex of the shell, the base is also spirally sculptured, but the sculpture is less distinct, the mouth of the shell is unarmed, but the parietal callus forms a raised curved ridge which is distinctly free at both ends from the penstome. The armature, which is comparatively simple, occurs a little beyond the middle of the last whork, and consists of a simple erong vertical plate on the parietal wall (see ing 55 a), giving off at its upper extremity a very small horizontal tooth on the posterior side and a short horizontal lamella. 1.5 millimetres long, on the anterior side, while at its lower extremity there is a slight callus on the posterior side vertical parietal plate is shown sideways in fig 55 b, where also

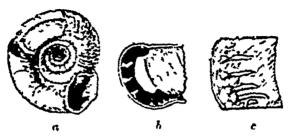


Fig 35 -Pleatopylis andersons

the palatal teeth are seen as they appear from the posterior side. Fig. 55c gives the inside view of the outer wall, exhibiting the palatal armature, which consists of four principal horizontal lamellæ terminating posteriorly in a triangular conical tooth; above these are first a minute tooth, and secondly, higher up, a small fold near the suture, while at the base of the palatal wall are also first a minute tooth, and secondly, nearer the suture, a small fold. The specimen figured is in Mr. Ponsonby's collection.

III. Section Exporton, Gude.

Endoplon, Gude, Science Gossip, N s vi, 1899, p 148

Dextral. Palatal folds horizontal, oblique, or almost vertical. Tipe, Helix (Plectopylis) brachyplecia, Benson.

Range Burms, Tonkin

103 Plectopylis smithiana, Gude

Plectopylis smithiana, Gude, Science Gossip, N. 8 in, 1897, p 274, fig 38 (shell and armature)
Plectopylis (Endoplon) smithiana, Gude, op cit. vi, 1899, p 148

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Original description - "Shell dextral, discoid, widely umbilicated, rufous brown, coarsely and regularly ribbed, with scarcely visible microscopic sculpture above, but strongly decussated with spiral lines below, suture impressed Whorls 6, convex, slowly increasing, the last rapidly widening towards the aperture, not angulated above, shortly descending in front Aperture subtriangular: peristome light brown, a little thickened and reflexed. the margins converging, parietal callus with a strongly raised flexuous ridge, separated from both margins of the peristome Umbilicus very wide but shallow. Parietal wall, with an entering flexuous horizontal fold, united to the ridge at the aperture, and at one-third of the circumference from the aperture with one crescent-shaped vertical plate, which has two small denticles, one above and one below, on the anterior side Palatal folds 6, the first and sixth thin and horizontal, the other four short, broad, and oblique" (Gude)

Major diam 27, minor 21 mm.; alt 10 mm.

Hab. Burma. Attaram

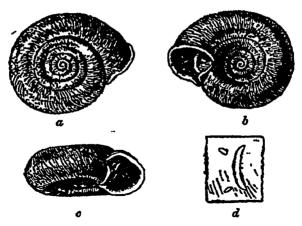


Fig 56 -Plectopylis smithiana

Two specimens in the Theobald collection in the British Museum, labelled *P biachyplecta*, in spite of some external resemblance to that species, presented sufficient differences to induce me to suspect that they were quite distinct, and upon opening one of them the difference in the armature quite confirmed this

suspicion

P smithiana differs from P. brachyplecta in being larger and darker in colour. The ribs are coarsel and the whorls more convex; the last whorl is not angulated above, and it widensmore towards the aperture. The peristome is less thickened and more reflected, and the ridge of the parietal callus less stout but more raised, while the umbilicus is wider and much more shallow. The horizontal parietal fold deflects more at the aperture, and there is only one vertical plate (see fig. 56 d), which is crescent-

shaped, with the convex side towards the aperture; on its anterior side, in place of a second vertical plate as in P brachuplecta, are found two elongated, oblique, converging denticles, one above and one below. The pilatal armature is similar to that of P. brachv-Fig 56 d, which shows the parietal wall, is from one of the specimens in the British Museum Figs. 56 a-c are drawn from a specimen, labelled Attaram, obligingly lent to me by the late Miss Linter, of Arragon Close, Twickenham, who informed me that she received it from Mr Theobald. This was also labelled P. brachuplecta, but I had no hesitation in referring it to P. smithiana. It measures-major diam 26; minor 21 mm., alt. 9 mm.

104. Plectopylis brachyplecta. Benson.

Helix (Pleetopylis) brachyplecta, Benson, A. M. N. H. ser. 3, xi, 1863, p 319; Godwin-Austen, P Z. S 1874, pl 74, fig. 8 (armature); Nevill, Hand List, 1, 1878, p 72

Helia brachyplecta, Hanley & Theobald, Conch Ind 1870, pl 67,

hgs 7, 10

Helia (Atopa (Plectopylus)) brachypicata, Tryon, Man Conchser 2, m, 1887, p 163, pl 35, figs 76, 77, 82, 83
Plectopylus brachypicata, Pilsbry, Man Conchser, 2, 1x, 1894, p 145;

Gude, Science Gossip, & 8 in, 1897, p 246, hg 37 (shell and

Plectopylis (Endoplon) brachyplecta, Gude, op cit. vi, 1899, p 148

Original description -" II. testa dextrorsa, late umbilicata, discoidea, obesiuscula, minute arcuato-striata, striis minutissimis spiralibus obsolete decussata, opaca, non nitida, rubescenti-castanca, superne saturatiore, circum apicem succinea, spira planata, apice vix prominente, sutura impressa; aufractibus 6, lente accrescentibus, convexiusculis, ultimo rotundato, superne prope suturam subangulato, antice descendente; apertura obliqua, rotundato-lunari, subauriculata, intus lilacina; peristomate expansiusculo, rufo-castaneo, marginibus remote convergentibus, plica arcusta prominente parietali junctis, lamina longiuscula subascendente e medio plica intus recedente, plicis 2 parietalibus remotis verticalibus, quarum externa arcuata internaque curvata, laminis 6 remotioribus palatalibus, quarum superiore et basali tenuibus et 4 medianis incrassatis, foveatis; umbilico lato, concavo

"Diam maj 22, min. 18, axis 8 mill" (Benson.)

Hab Burma. Moulmain (Gordon); Attaran Valley (Theobald) The shell is disk-shaped, widely umbilicated, dull reddish chestnut, with amber-coloured apex, paler below, finely and regularly ribbed, and decussated by minute spiral sculpture It is composed of six or six and a half more or less convex whorls, which increase slowly, the last being rounded and subangulated above, near the suture, and shortly and abruptly descending in front The aperture is ear-shaped, and the peristome brown, strongly thickened and a little reflected, its slightly converging margins being joined by a thickened curved ridge, which is slightly notched at the junctious above and below. A strong entering flexuous fold is 118 HELICIDÆ

given off from the parietal ridge, revolving over less than a quarter The parietal armature further consists of two strong. of a whorl vertical, slightly curved, parallel plates; the anterior one has a short horizontal support posteriorly below, and a strong horizontal ridge anteriorly above, the posterior one gives off on the posterior side two short supports, one above and one below. A short, free horizontal fold occurs below the vertical plates Fig. 57 d shows the parietal wall with its plates and the fold. while fig 57 f gives the anterior view of both parietal and palatal armatures The valatal armature consists of first, a thin horizontal fold near the suture; next. four short, broad, oblique, nearly parallel folds, whose lower concave sides face the aperture, finally, a short thin horizontal fold near the lower suture little above the second fold and united to its posterior extremity occurs a very short straight fold, while another short, slight oblique fold is found between the posterior ends of the fifth and

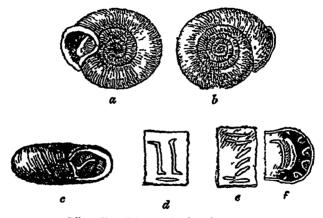


Fig. 57 —Plectopylis brachyplecta

sixth folds (See fig. 57c, which shows the inside of the outer wall with its palatal folds.) Figs 57 d-f are from one of the type specimens from Moulmain in the McAndrew collection of the University Museum of Zoology, Cambridge, the shells having been lent for this purpose by Dr. S. F Harmer It measures—

major diam. 22. minor 18 mm; alt 8 mm.

Among the shells of the genus Plectopylis in the British Museum, I found two specimens in the Theobald collection, labelled Plectopylis clathratula, Benson, from Balcadua, Ceylon. I am not aware that Mr Benson ever published this name, but Dr. Pfeisfer described a species belonging to Ruthvenia—a section formerly believed to pertain to Plectopylis, but now known to have affinity with Endodonts—from Ceylon, under that name. As no species of Plectopylis has ever been found in Ceylon, it is probable that there is a mistake in the locality, and it is certain that the name is wrong. Judging from the external resemblances to Plectopylis

brachyplecta, I suspected that these shells would prove to pertain to that species, and having obtained permission from Mr Edgar Smith, the late Assistant Keeper, to open one of the shells, I was enabled to confirm my suspicion, for the armature proved to be identical with that of P. brachyplecta One of these specimens is shown in three different positions in figs 57 a-c It measures major diam 22, minor 185 mm.; alt 8 mm

IV. Section Plectorylis, s s., Gude (Typical section of Benson.)

Science Gossip, N s vi, 1899, p 148

Sinistral, shell flattened. Palatal armature. one vertical plate with three horizontal folds above, one below.

TYPE, Plectopylis bensons, Gude.

Range Burma.

105. Plectopylis ponsonbyi, Godwin-Austen.

Helix (Plectopylis) ponsonbyr, Godwin-Austen, P Z S 1888, p 243

Plectopylis ponsonby, Pilsbry, Man Conch. ser 2, ix, 1894, p 144, pl. 40, figs 9-12 (shell and armature), Gude, Science Gossip N. 8 III, 1896, p 178, fig 22 (shell and armature)
Plectopylis (8 E) ponsonbyi, Gude, op cit vi, 1899, p 148

Original description:—"Shell sinistral, widely umbilicated, discoid, solid; sculpture, wavy thread-like lines of growth; colour pale brown, spire flat, 2½ whorls at apex slightly raised above the succeeding whorls; suture very shallow; whorls 7, closely wound and flat; aperture very oblique, descending, horizontally ovate, peristome thickened, reflected, the margins connected by a well-developed ridge, and with slight notches at the inner angles.

"Major diam. 175, minor 14, alt 5 m.n." (Godwin-Austen)

Hab. Upper Burma - Hlundet (Spratt)

The shell is sinistral, disk-shaped, flattened above, with the apex a little raised, composed of six and a half whorls, closely and regularly coiled, rounded and gradually increasing, it is regularly and finely ribbed, and has the last whorl deflected in front; the parietal callus has a raised flexuous ridge, which is separate above and below from the peristome. From the aperture may be discerned a short, free, slightly curved, parietal fold, which follows the deflection of the last whorl (see fig. 58 a). The parietal armature further consists of two strong vertical plates; the posterior one of which is the longer of the two; it gives off posteriorly at the upper extremity a very short horizontal ridge, and at the lower extremity another short, but stronger, ridge, which descends obliquely; the anterior plate is shorter but much stronger and thicker than the posterior one, and it gives off two

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strong ridges, one from the upper and one from the lower extremity, gradually decreasing in height. Below these two vertical plates there is a very thin horizontal fold terminating posteriorly a little beyond the posterior vertical plate, and anteriorly becoming attenuated till it is scarcely visible at the panetal ridge, to which, however, it is united. In the figure referred to, I regret to find this horizontal fold is wrongly shown as terminating a little beyond the anterior vertical plate. The palatal armature consists of a first, a thin horizontal lamina, parallel with and near to the suture, a little broader in the middle, secondly, a somewhat stouter lamina, slanting downwards a little posteriorly, also a little broader in the middle, and abruptly decreasing anteriorly, but very slowly posteriorly, where it is slightly indented, thirdly, a similar lamina, slanting a little more posteriorly,



Fig 58-Plectopylis poneonbyn

with a slight indentation; fourthly, a stout bilobed vertical lamina, giving off anteriorly at the upper extremity a very slight ridge and posteriorly from the base of each lobe a short ridge; fifthly, a horizontal fold parallel with and near to the lower suture, raised in the middle, with the spical portion reflexed and angular: it has a very small denticle on the posterior side Another very small denticle is situated a little below the first horizontal lamina, about its middle, erroneously shown in a line with it in fig. 58 d Fig 58 b shows the whole of the armature from the side of the aperture, fig 58 c the same from behind and fig. 58 d the irside of the outer shell-wall with the palatal folds (all magnified); while fig 58 e exhibits the shell restored, from above, natural size The type specimen is in Mr. Ponsonby's collection and measures 18 mm. in diameter. A specimen sent to me for examination by the late Dr von Möllendorff, labelled P. refuga, proved to pertain to the present species; it measures 21, 17, and 7 mm. respectively, and the fold at the aperture is longer and nearer to the ridge than is the case in the type

106. Plectopylis lissochlamys, Gude.

Plectopylis lissochlamys, Gude, Science Gossip, N s iv, 1897, p 70, fig 53 (shell and armature), Journ Malac vii, 1898, p 11, fig 8

Plectopylis (s. s.) lissochlamys, Gude, Science Gossip, N. s vi, 1899, p 148.

Original description: - "Shell sinistral, solid, discoid, widely and deeply umbilicated, polished, corneous, finely and regularly ribbed, decussated with minute spiral sculpture above Suture impressed, apex a little raised, spire depressed Whorls 7, rounded, increasing slowly, the last twice as wide as the penultimate, widening towards the aperture, but not constricted behind the peristome. Aperture rounded, elliptical, peristome white, rather thin, reflexed; margins a little converging Parietal callus with a raised flexuous ridge separated from both margins of the peristome by a little notch. Umbilious wide and deep Parietal wall with a short, entering, flexuous horizontal fold, which runs close up to the ridge at the aperture, and at one-third of the circumference from the mouth there are two rather thin transverse parallel laminæ descending obliquely backwards, the posterior one longest and with a short ridge posteriorly both at the upper and the lower extremity; the anterior one with a longer ridge anteriorly at the upper extremity, and two short but stouter ridges at the lower extremity, one anteriorly and one posteriorly; below these laminæ occurs a thin horizontal fold class to the lower suture. becoming attenuated but distinctly perceptible at the aperture, where it unites with the flexuous ridge Palatal folds 5, the three upper horizontal, thin, the first and second with a denticle posteriorly; the fourth vertical, the upper part deflected anteriorly, the lower part deflected posteriorly, with two denticles posteriorly, one about the middle and one near the lower extremity; the fifth short, horizontal, indented at the middle, with a slight curved denticle posteriorly.

"Diam. major 19-20, minor 16-17 mm; alt. 6-7 mm." (Gude)

Hab. Burma.

The present species was based upon two unnamed specimens from Burma sent to me by the late Miss Linter. Among a number of Plectopylis forwarded to me for inspection by the late Dr. von Mollendorff were two shells labelled P. refuga which proved to be identical with Miss Linter's shells. P. hisochlamys differs from P. magnu in being much smaller and shining, as well as paler in colour; in shape and texture it resembles P. pulvinaris which, however, is dextral and has a totally different armature. It is allied to P. ponsonby but is more solid, darker coloured, and more coarsely ribbed, while the last two whorls increase more suddenly, and the last is not constricted behind the peristome as is the case in that species. The two parietal lamine, moreover, are much thinner (see fig. 59 e) and the anterior ridges of the anterior lamina are much shorter and slighter; they are parallel,

not convergent as in *P. magna*. A comparison of the figures will indicate differences in the palatal armatures of these two species

The type specimen is here figured and is in my collection, it measures 19 mm. in diameter. Figs 59 a-c are natural size,

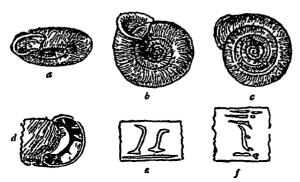


Fig 59 -Plectopylis lissochlamys

while figs. 59 d-f are magnified Fig. 59 d shows the parietal and palatal barriers from the posterior side; fig 59 e a part of the parietal wall with its laminæ and fold; and fig 59 f the inside of the outer shell-wall with its folds and denticles

107 Plectopylis magna, Gude.

Plectopylis magna, Gude, Science Gossip, N. s iv, 1897, p 70, fig 52 (shell and armature), Journ Malac vii, 1898, p 9, fig 7 Plectopylis (s s) magna, Gude, Science Gossip, N. s. vi, 1899, p 148

Original description: -- "Shell sinistral, solid, discoid, widely and deeply umbilicated, horny brown, finely and regularly ribbed. Suture slightly impressed, spire depressed, apex scarcely raised Whorls 72, a little rounded above, turned below, increasing very slowly, the last widening a little towards the aperture, descending somewhat slowly in front, and a little constructed behind the peristome. Aperture elliptical, peristome white, thickened and reflexed, maigins scarcely converging. Parietal callus with a raised flexuous ridge, separated from both margins of the peristome by a little notch Umbilicus wide and deep Parietal wall with a short, entering, flexuous, horizontal fold, which terminates at a distance of two millimetres from the parietal ridge at the aperture, and having at one-third of the circumference from the aperture two strong transverse plates; the posterior one the longer, vertical, and a little flexuous, giving off a short, obliquely raised ridge posteriorly above, and a short, strong, obliquely deflected ridge posteriorly below, the anterior one oblique, the upper extremity converging towards the posterior plate, where it gives off posteriorly a short, strong ridge, and anteriorly a strong, longer ridge, which becomes attenuated; at the lower extremity it gives

off two short, strong ridges, one posteriorly and one anteriorly; below these plates occurs a thin fold, close to the lower suture, revolving as far as the aperture, where it unites with the flexuous ridge. Palatal folds 5; the three upper horizontal; the first straight and having an elongated denticle below it at about the middle; the second a little deflected posteriorly; the third short, crescent-shaped, the fourth vertical, flexuous, the fifth horizontal, abruptly deflected anteriorly above and posteriorly below. Posteriorly between the first and fifth folds occur six denticles, placed vertically in a row, the first in a line with the elongated denticle below the first fold, the second a little above and the third a little below the second fold, the fourth in a line with the upper extremity, the fifth near the middle, and the sixth a little below the lower extremity of the vertical fold.

"Major diam. 22 5-25, minor 18 5-21; alt 8 mm." (Gude)

Hab Burms. Taunghu, Pegu.

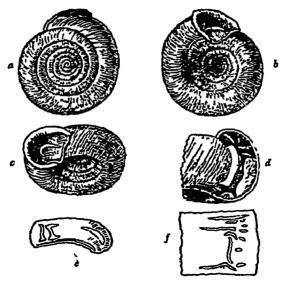


Fig 60 -Plectopylis magna

Lake the last species, the present form was based upon material sent to me by the late Miss Linter and found among a miscellaneous collection of *Plectopylis* from Burna. A shell in the possession of Mr. E. R. Sykes, labelled *P. achatina*, was also referred to this species. Subsequently I discovered two specimens in the late W. T. Blanford's collection, labelled "Taunghu, Pegu; H. F. Blanford". I have also seen two specimens collected by Theobald, which are now in the possession of Mason's College, Birmingham, and which were labelled *P. repercussa*; the latter measure respectively. 23 5, 19 5, 9 mm, and 25, 20, 9 mm.

Plectopylis magna differs from P. ponsonby: in being much larger, more solid, and darker in colour, in having one whorl more, in the

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last whorl descending less abruptly, and in the whorls being more rounded. There are also differences in the armature. i. c. the two parietal vertical laminæ are convergent above, and the posterior one is considerably longer than the anterior one (see fig. 60 c). while in Plectopylis ponsonbyi they are almost equal and parallel; the anterior lamina gives off anteriorly below a short, stout ridge, not a distinct fold as in P ponsonby, and the thin fold near the lower suture is distinctly continued to the ridge at the aperture, without becoming attenuated: the two upper palatal horizontal folds are much thinner, the third is very short and crescent-shaped, and the vertical fold is not bilobed, while there are several more denticles posteriorly (see fig. 60 f, which shows the inside of the outer wall) The type specimen figured is in my collection and measures 25 mm in diameter, a second specimen measuring A third specimen, from the same source, is not quite mature, the ridge on the parietal callus at the aperture not having been formed, but the armature is identical with that of the mature Figs. 60 a, b, c, and e are of natural size, while d and f are magnified

108. Plectopylis woodthorpei, Gude.

Plectopylis woodthorper, Gude, Science Gossip, N. s vi, 1899, p 15, fig 98 (shell and armature)

Plectopylis (s s) woodthorper, Gude, tom cit p. 148

Original description —"Shell dextral, discoid, widely and deeply umbilicated, dark corneous, finely and regularly ribbed, closely decussated by microscopic spiral lines. Spire conical, apex prominent, suture impressed. Whorls 6½, increasing slowly and regularly, flattened above, tunid below, the last scarcely wider than the penultimate, bluntly keeled above the periphery, widening a little towards the aperture, descending deeply in front. Aperture oblique, cordate; peristome whitish, strongly thickened and reflexed, the margins united by a strongly raised flexuous ridge, which is concave in the middle, and notched at the junctions above and below

"Parietal armature consisting of two nearly parallel vertical laminæ, the posterior one longer, slightly reflected posteriorly at its lower extremity, and provided posteriorly at the upper extremity with a slight ridge; the anterior lamina shorter, giving off a horizontal fold anteriorly at each extremity, the lower less than half the length of the upper, ascending obliquely; the upper revolving almost parallel with the suture, following the deflection of the whorl, and joining the ridge at the aperture. Below the posterior vertical lamina rises a free, thin, horizontal fold, at first considerably elevated above the shell-wall, but suddenly becoming attenuated and thread-like, running parallel with the lower suture, as far as the aperture where it is joined to the ridge on the parietal Palatal armature in two series, the posterior series concallus first, a long thin horizontal fold near the suture; sisting of

secondly, a very long horizontal fold, extending anteriorly beyond the folds of the second series, with an elevated compressed denticle posteriorly; thirdly, a very short horizontal fold, deflected posteriorly; fourthly, a strong vertical lamina, with an indentation at the middle, giving off posteriorly at its lower extremity an obliquely descending ridge, and provided at the same place with a small denticle; at the base of the upper lobe of the vertical lamina on the posterior side occurs a slight swelling, while on the same side from its upper extremity runs a short ridge, connecting this

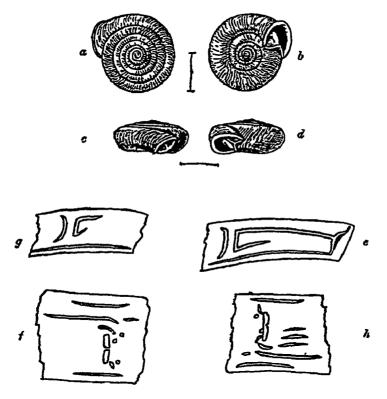


Fig 61.-Plectopylis woodthorper

lamina with the third horizontal fold; fifthly, a long thin horizontal fold near the lower suture. The anterior series consists of three thin horizontal folds, the first longest the third shortest, all three descending a little anteriorly." (Gude)

Major diam 8 75-10, minor 7 25-8 mm, alt 3 25-4 mm

Hab Burma Fort Stedman (Woodthorpe)

Three specimens—two mature, one young—collected by the late Col Woodthorpe, RE, after whom the species is named, were communicated by Lt-Col Godwin-Austen and are now in

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The species is a very interesting one. the British Museum. forming as it does a connecting link between the two sections Chersecia and Plectopylis s s. On the one hand it resembles P ponsonby in the posterior portion of the palatal armature (see fig 61 f), and P leucochila in the parietal barriers (see fig 61 e). it differs, however, from the other members of this group in having a series of horizontal folds anteriorly to the vertical palatal lamina On the other hand this biseriate character of the palatal armature unites it with the group of P plectostoma. In outward appearance the shell of P. woodthorper much resembles P. shirorensis but it is much larger. The immature specimen referred to, which has nearly six whorls formed, has the armature incomplete, and is instructive as possibly throwing some light upon the evolution of The parietal armature here possesses the two these structures vertical laminæ, but the horizontal folds given off by the anterior lamina are very short, being only one-quarter of the length of those in the mature shells, the thin fold near the lower suture is not compressed into a lamellar fold below the vertical laminæ, as is the case in the full-grown shells, and it rises much farther back (see fig. 61 q, which shows portion of the parietal wall with its armature) Of the palatal armature, only the posterior series of processes is present, the anterior series having still to be formed; a fact clearly pointing to the more recent origin of the biseriate forms. vertical lamina is distinctly divided into two subequal portions, in consequence of the indentation in the middle being carried down to the base of the lamina; the ridge connecting the upper extremity of the vertical lamina with the short horizontal fold above it is absent, but in its stead occurs near the latter a little denticle, while posteriorly to the upper half of the vertical lamina is found a distinct denticle, corresponding to the slight swelling in the same place, mentioned in the diagnosis (see fig. 61 h, which shows the inside of the palatal wall with its armature)

109. Plectopylis leucochila, Gude.

Plectopylis leucochilus, Gude, Science Gossip, N. s. iv, 1898, p. 231, iig 66, ibid p 264 (leucochila)
Plectopylis (s. s.) leucochila, Gude, op cit. vi, 1899, p. 148

Original description — "Shell sinistral, rather solid, discoid, deeply and perspectively umbilicated, pale yellowish corneous, finely and regularly ribbed, ornamented with minute spiral sculpture. Suture almost linear, spire depressed, apex scarcely raised. Whorls seven to seven and a half, a little rounded above, rather tumid below, increasing slowly and regularly, the last descending abruptly and rather deeply in front. Aperture roundly oval; peristome white, a little thickened and strongly reflexed, the margins a little converging; parietal callus with a slightly raised flexuous ridge, separated from both margins of the peristome by a little notch. Umbilicus deep, widely perspective

Parietal wall with two transverse oblique laminæ converging upwards, the posterior one rather thin, slightly sinuous, and having a short ridge posteriorly at the upper and lower extremities. the anterior one shorter, but much stronger and stouter, having an ascending ridge posteriorly above and a short stout support posteriorly below, on the anterior side are found two strong horizontal folds, the lower stout and short and becoming suddenly attenuated, the upper fold long, rather thinner, following the deflection of the last whorl and terminating close to the ridge at the aperture, but not being united to it, a very thin horizontal fold rises below the transverse laming close to the lower suture. runs parallel with it, and terminates at the ridge at the aperture Palatal folds, 5 the first near the suture, straight and nearly horizontal: the second a little more oblique and deflected posteriorly; the third nearly horizontal, but more deflected posteriorly all three have a slight indentation near the posterior extremity forming a bead-like termination, the fourth is vertical, deflected a little anteriorly above and posteriorly below, having posteriorly

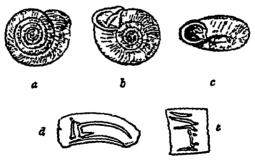


Fig 62 -Plectopylis leucochild.

a small denticle near the lower extremity and another about the middle, the fifth is near the lower suture, horizontal and deflected at both extremities" (Gude.)

Major diam 15-17, minor 12-14 mm; alt. 6-7 mm.

Hab. Burms.

Five specimens received from Mr Fulton as P. leiophis proved upon examination to be distinct, and to belong, in fact, to a

different section of the genus.

Plectopylis leucochila is allied to P. ponsonbyi, but differs from it in the more raised spire and in having a deeper and more perspective umbilicus. In the armature it differs from the other members of the group of P. ponsonbyi in having the upper parietal fold uninterrupted. Figs 62 a-c show the shell in three different aspects, natural size, while figs 62 d and e are enlarged, the former shows the parietal wall with its laminæ and folds, and the latter the inside of the outer wall with the folds and denticles

A specimen in the Blanford collection, labelled "H. F Blan-

ford," I refer to this species

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110. Plectopylis feddeni, Blanford

Helix (Plectopylis) feddem, Blanford, J.A.S. B. xxxiv, 1865, p. 75, Godwin-Austen, P. Z.S. 1874, p. 611, pl. 74, fig. 7 (parietal armature), Nevill, Hand List, i, 1878, p. 71, Tapparone Canefri, Ann. Mus. Civ. Genova, ser. 2, vii, 1889, p. 47.

Helix feddem, Hanley & Theobald, Conch. Ind. 1875, pl. 181, figs. 1-3.

Helix (Atopa (Plectopylis)) feddem, Tryon, Man. Conch. ser. 2, ni, 1887, p. 163, pl. 35, figs. 84-87.

Plectomylis feddem, Pilabry, Man. Conch. ser. 2, ix. 1894, p. 145.

Plectopylis feddeni, Pilsbry, Man Conch. ser 2, ix, 1894, p 145, Gude, Science Gossip, x s iv, 1897, p 171, fig 64, vi, 1899, p 76, fig 104

Plectopylis (s s) feddeni, Gude, op cit vi, 1899, p 148

Original description:—"Shell sinistrorse, very widely umbilicated, discoid, flat above, thin, dull white, marked by rather irregular oblique sculpture both above and below. Spire quite flat, apex not rising above the surface, suture impressed. Whorls 6½-7, narrow and closely wound, slightly convex above, the last much broader, rounded at the periphery and beneath, descending

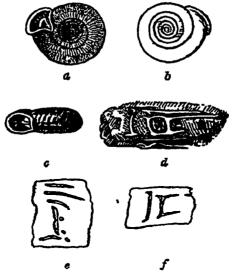


Fig 63 -Plectopylis feddeni

abruptly close to the mouth. Umbilicus shallow, exposing all the whorls. Aperture more nearly horizontal than vertical, subcircularly lunate Peristome slightly thickened, expanded throughout, margins joined by a rib, from the centre of which a lamina sometimes runs up to the parietal plication, but is frequently interrupted a short distance within the aperture, and is always thicker and higher near the mouth than farther back Parietal plication consisting of a vertical lamina in front, and a second, slightly oblique, just behind; the first giving out the interrupted lamina running to the aperture from the top, and a

shorter horizontal lamella from the bottom: the hinder with small re-entering supports above and below. Beneath both is a narrow free thread-like horizontal lamella Palatal teeth 5 1st. 2nd. 3rd, and 5th horizontal, 4th vertical and stouter than the others; 1st and 2nd longer than the remainder." (Blanford)
Major diam 16, minor 13 mm; alt 45 mm

Hab Burma. Prome (Fedden, Blanford, Hungerford, Fea): Thret-Myo (Blanford)

111 Plectopylis cairnsi, Gude.

Plectopylis cairnsi, Gude, Science Gossip, N s v, 1898, p 171. fig 90 (shell and armature) Plectopylis (8 8) carren, Gude, op cit vi, 1899, p 148

Original description - "Shell sinistrorse, discoid, solid, widely umbilicated, yellowish corneous, finely and regularly ribbed, and decussated with microscopic spiral lines Spire depressed, apex scarcely prominent, suture distinctly impressed; whorls 5½, turned above, rounded below, increasing slowly and regularly, the



Fig 64.—Plectopylis carrisi

last descending moderately in front; aperture oblique, cordate, a little inflexed at the upper outer margin. Peristome white. strongly thickened and reflexed; the margins united by a strong raised flexuous ridge on the parietal callus, notched at the junctions above and below. Parietal wall with a strong median fold given off from the apertural ridge, revolving round about a quarter of the last whorl, but interrupted at the middle; near its posterior extremity occurs a branched fold in the form of the Greek letter A, & e an obliquely ascending fold, having anteriorly

at its lower extremity a slightly ascending ridge and posteriorly a short support; it is deflected horizontally at its upper extremity, and at about its middle it gives off an obliquely descending arm. which deflects horizontally at its lower extremity Palatal folds five the first, thin, horizontal, near the suture, a little indented and reflexed opposite the upper extremity of the oblique parietal fold, the second, horizontal, a little shorter and deflected posteriorly, provided with a small denticle a little above its posterior extremity, the third, still shorter, but broader, horizontal, crescent-shaped, its concave side towards the fourth, which is vertical, very strong, inclined towards the aperture, near its lower extremity on the posterior side occurs a minute denticle, the fifth is horizontal, short and very thin " (Gude)

Major diam 185, minor 155 mm., alt 6 mm.

Hab Probably Burma

P carrier is flatter and more rounded in outline than P benson. the whorls are more rounded and not angulated, the last whorl widens less at the aperture, the suture is more impressed, the umbilious less deep, and the peristome is white. The parietal armature differs from that of P benson and its allies in the median fold being interrupted in the middle and separated from the branched portion which is in the form of the Greek letter \(\lambda \), and in the total absence of the horizontal fold near the lower suture (see fig. 64 d, enlarged, which shows the parietal wall with its folds). In the palatal armature there are also some minor differences: the first horizontal fold is indented opposite the upper arm of the branched parietal fold, a feature I have not observed in any other species; the vertical plate is also much narrower than in P bensoni, leaving more space for the soft parts of the animal to emerge (see fig 64 e, which shows both armatures from the anterior side, and fig. 64 f, from the posterior side, both enlarged), and, finally, the denticle behind the fifth horizontal fold, present in every other known species of the group of P. benson, is absent (see fig. 64 g, enlarged, which shows the inside of the outer wall with the palatal armature The figures are all based on the type which is in my ın sıtu) collection.

112 Plectopylis cyclaspis, Benson

Helix catinus, Benson, A. M. N. H. ser 3, ni, 1859, p. 185 (non H-catinus, Pfeiffer, 1856)

Helix cyclaspis, Benson, tom. cit. p 273, Hanley & Theobald, Conch Ind 1870, pl 13, fig 10

Hehr (Plectopylis) cyclaspis, Benson, op cit v, 1860, p 245, Godwin-Austen, P Z S 1874, pl 74, fig 10 (palatal armature), Nevill, Hand List, 1, 1878, p 72

Hehr (Atopa (Plectopylis)) cyclaspis, Tryon, Man Conch ser 2, 111, 1897, p. 1897,

1887, p 164, pl. 35, fig 9.

Plectopy'is ciclaspus, Stoliczka, J. A. S. B. xl, 1871, p. 222, pl. 15, figs. 4-6 (anatomy etc.), Pilsbry, Man. Couch. ser. 2, ix, 1894, p. 141, pl. 12, figs. 34-36 (anatomy etc.), Guds, Science Gossip, v.s. iii, 1897, p. 244, fig. 34 (shell and armature). Plectopylis (s. s.) cyclaspus, Gude, op. cit. vi, 1899, p. 148. Helix revoluta, Pfeiffer, Malak. Blatt. xiv, 1897, p. 64

Original description—"Testa sinistrorsa, late umbilicata, lenticulari-depressa, levigata, superne demum obliquo rugata, fuscescente; spira depressa conoidea, apice obtuso, sutura marginata, anfractibus 7½ lonte crescentibus, superne planulatis, ultimo non descendente, acute carinato, carina compressiuscula, basi convexa, circa umbilicum profundum perspectivum subangulata; apertura perobliqua, rotundato-lunari, peristomate expanso, reflexo, superne prope carinam prominente, angulato, marginibus lamina valde elevata lamellam breviter intrantem emittente junctis

"Diam. maj 18, minor 16, axis 6f millim." (Benson)

Hab. Burma. Moulman (Theobald, Stoliczka), Damsang and

Bussom Peak (Godwin-Austen).

A well defined species which may at once be separated from all its congeners by the keeled periphery. Hehx revoluta was described by Pfeifier as from the Andaman Islands. Unfortunately, I have been unsuccessful in tracing the whereabouts of the specimens from which the diagnosis was drawn up, as Mr. Smith, who kindly searched the collection in the British Museum, has been unable to find them there; and the late Professor Boettger informed me that they are not in the Pfeifier collection acquired



Fig 65 -Plectopylis cyclaspis

by Dr Dohrn This is all the more to be regretted as no Plectopylis has since been discovered in the Andaman Islands. The
late Mr Stoliczka (J A S B xl, 1871, p 223) was of opinion that
this shell could hardly be distinct from Plectopylis cyclaspis, his
specimens of which agreed perfectly with the measurements given
by Dr. Pfeiffer. He adds that amongst many thousands of shells
from the Andaman Islands, he never received P. cyclaspis and he

doubted its occurrence there as much as that of P benson.

recorded by Tryon in Proc Asiat. Soc. 1870, p. 88

The peristome of P. cyclaspis is thickened and reflexed and its margins are united by a raised lidge, the parietal callus bears a short, strong, horizontal, entering fold, visible in its entirety from the aperture (see fig. 65 α). The parietal armsture consists of a strong and very complicated lamified lamina, which ascends obliquely from the side of the aperture near to the suture, where it bifurcates, one arm—the upper one—ascending a little, then proceeding horizontally and finally becomes attenuated, the lower and stronger one descends obliquely at an angle of 45° for about balf its length, then deflects almost vertically and gives off posteriorly at its base a short strong support. The lower extremity of the main lamina also gives off anteriorly a short strong support Below the lamina is a free, short, horizontal fold specimen shown with the outer wall removed in fig. 65b is not quite mature, and it possesses the former barrier, which is evidently in course of absorption, as the second descending arm has almost disappeared, and the lower free fold is also very slight.

The palatal armature consists of five folds the first thin, near to and almost parallel with the upper suture, the second, broad and flexuous, descending obliquely posteriorly, halt above and half below the peripheral keel, the third also broad and somewhat crescent-shaped, the fourth very strong, broad, and vertical, and intercalating with the main stem and lower branch of the parietal lamina, the fitth thin, houzontal, and parallel with the lower Fig 65 c shows the parietal and palatal barriers from the anterior side, while fig 65 d exhibits the inside of the outer wall with its palatal folds. At the base of the vertical palatal fold on the light side—r e posteriorly—occurs a small denticle, shown erroneously on the left side Fig 65 a shows a mature specimen, and is of ratural size, the other figures are all magnified Both specimens are from Moulmain and are in Mr Ponsonby's collection The mature shell measures, major diam. 17, minor

145, alt 7 mm.

113. Plectopylis karenorum, Blanford

Helix (Plectopylis) Larenorum, Blanford, J. A. S. B. xxxiv, 1865, p. 73, Godwin-Austen, P. Z. S. 1874, pl. 74, fig. 5 (shell and

aimatuie)

Helix kan enorum, Pfeister, Novit. Conch sei 1, in, 1869, p 503, pl 108, figs 16-18, Hanley & Theobald, Conch. Ind 1870, ol 13, fig 6

Helit (Atopa (Plectopyles)) Larenorum, Tryon, Man Conch ser 2, m. 1887, p 164, pl 35, figs 96-100

Plectopylis Larenovium, Pilsbry, Man Conch ser 2, 1x, 1894, p 145, Gude, Science Gossip, N 8 111, 1887, p 244, fig 35

Plectopylis (s s) karenorum, Gude, op cit vi, 1899, p 148

· Original description — 'Shell sinistrorse, very widely umbilicated, discoid, flat above, solid, white, with rather irregular oblique pale chestnut streaks crossing the whorls, transversely and sinuously striated with decussating spiral lines above and below: epidermis thin, horny. Apex minutely granulate or sub-granulate, almost imperceptibly raised above the flat spire; suture not impressed, very narrowly marginate Whorls 6, narrow and closely wound, flat above; the last angulate above the periphery, rounded beneath, descending close to the mouth, very slightly compressed behind the same. Umbilious very shallow, exposing all the whorls, aperture diagonal, truncately subcircular, peristome white, reflexed throughout, margins joined by a raised bar, from the centre of which a lamina passes up the parietal side of the whorl to the plication, which lies at about & the circumference of the whorl from the mouth, and resembles that of Helix achaina, Gray, the parietal transverse lamina being simple and oblique above, then bifurcating, giving off the lamina which runs to the mouth, and two short basal supports. A thread-like lamina also runs along the extreme base of the parietal side of the whorl, and joins the aperture Palatal teeth 5, the upper 3 and the lowest longitudinal, the uppermost very long and thin, the 4th vertical, corresponding to the fork in the parietal lamina.

"Major diam 13-18, minor 11-15 mm.; axis 4-5 mm"

(Blanford)

Hab Burma. Banks of Tsanda Khyoung, near Kaintha village, and Banks of Nungatho Khyoung, Henzada district, Pegu (Blanford), Myanoung, Arakan Hills (Blanford)

The parietal armature consists of a long horizontal fold, united to the ridge at the aperture, and proceeding parallel with the last



Fig 66 -Plectopylis Larenorum.

whorl for a quarter of its length, at which point it gives off a shortly descending arm, it then rises obliquely for a short distance and finally bifurcates, the lower arm of the bifurcation being the longer, and obliquely descending, while the upper arm is slightly curved backwards; the single arm first mentioned has posteriorly at its lower termination a short obliquely descending ridge, and a little higher up anteriorly a stronger obliquely ascending ridge, while the lower arm of the bifurcation has posteriorly at its lower termination

a short obliquely descending ridge (see fig. 66 a). Below this complicated plate there is a free, thin horizontal fold close to the lower suture, also united to the ridge at the aperture (see also ing 66 b, which shows noth armatures from the side of the aperture, and fig 66 c, which gives their posterior view). The palatal armature consists of first, a thin and long horizontal fold parallel with and near the suture, secondly, another thin but shorter fold which at first proceeds horizontally, then suddenly deflects posteriorly with a slight curve backwards, a small denticle occurring posteriorly in a line with the main horizontal portion, thirdly, a short, somewhat stouter, crescent-shaped fold, with its concave side facing the aperture and lower suture, fourthly, a strong vertical fold, with two minute denticles posteriorly near its lower end, and fifthly, a thin horizontal fold, slightly deflected in the middle (see fig 66 d, which shows the inside of the outer wall) The specimen figured is in the collection of Mi. Ponsonby, it measures 135 millim in diameter

In looking over the specimens of *Plectopylis* of the McAndrew collection in the University Museum of Zoology, Cambridge, I found three specimens labelled *Plectopylis burmani*, Benson, doubtless a misspelling for *P burmanica*, one of Mr. Benson's MS names. On comparing them with *Plectopylis karenorum*, I found them to belong to that species. As I have reason to think that *P harenorum* exists in some collections under the name of *P burmanica*, and as, moreover, this name was never, to my knowledge, published by Mr. Benson, I have thought it useful to mention the above fact

114 Plectopylis linteræ, Mollendorff.

Plectopylis linterae, Mollendorff, Nachr. Deuts Malak Ges xxix, 1897, p 28, Gude, Science Gossip, N s v, 1898, p 170, fig 88. Plectopylis (s s) linterae, Gude, op cit. vi, 1899, p 148

Original description —"T sinistrorsa, latissima umbilicata, discoidea, solidula, subtiliter plicato-striata, lineis spiralibus tenuibus decussata, luteoflava, strigis castaneis regulariter variegata, spira vix prominula Anfractus 6 lente accrescentes, planiusculi, ultimus supra peripheriam subdistincte angulatus, tum convexiusculus, circa umbilicum subangulatus, antice breviter deflexus Apertura maxime obliqua, oblique cordiformis; peristoma sat expansum, reflexum, valde incrassatum, albo-labiatum, marginibus callo vallido elevato continuis. Lamella parietalis marginem attingens, intus producta, in tertia parte anfractus lamellam transversam duplicatam attingens; lamellæ palatales 4, superne 2 spirales quarum supera longior, tum verticalis 1 longa, denique infeia spiralis brevis

"Diam 165, alt 65 mm." (Mollendorff.)

Hab Burma Pegu, Moulmain.

The shell is sinistral, solid, discoid, widely umbilicated, pale yellow, transversely streaked and flammulated with chestnut, finely and regularly ribbed, smoother below, decussated with

microscopic spiral lines. The spire is slightly conical, the apex scarcely produced, and the suture linear. Whorls 6, increasing slowly and regularly, a little flattened above and rounded below, the last slightly angulated above the periphery and around the umbilicus, and descending rather abruptly and deeply in front The aperture is oblique, heart-shaped. The peristome is white, thickened and strongly reflexed, its margins are united by a strong flexuous raised ridge on the parietal callus.

The parietal armature is composed of a slight median horizontal fold, which proceeds from the apertural ridge, is interrupted for a short distance and then continues parallel with the suture for about a quarter of the last whorl, it then gives off a shortly descending, slightly reflexed arm, which is provided anteriorly at the lower extremity with a short horizontal ridge, the fold then

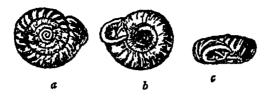


Fig 67 -Plectopylis lintera.

lises obliquely for a short distance and finally bifurcates, the lower arm of the bifurcation is the longer, and descends obliquely, its lower extremity being provided posteriorly with a short horizontal ridge, the upper arm at first continues to ascend obliquely, then deflects horizontally close to the suture; a short, free, thin, horizontal fold occurs below the two lower arms, not extending beyond on either side (see fig. 68 d, which shows the

parietal wall with its folds).

The palatal armature consists of first, a thin long horizontal fold near the suture and parallel with it, secondly, a shorter but stronger broad horizontal fold, which deflects a little and is slightly indented posteriorly, thirdly, a still shorter, broad, straight horizontal fold, fourthly, a strong broad vertical lamina which intercalates between the two lower arms of the parietal told, this laming is inclined towards the aperture, and its edge is thickened and reflexed, near its lower extremity on the posterior side occurs a strong little denticle, which is elongated horizontally: fitthly, a short thin horizontal fold close to the lower suture. having an elongated denticle a little above its posterior extremity. The species is closely allied to Plectopylis bensom, but the spire of the present shell is much more raised, the umbilicus is much deeper, and the whorls more rounded. In the armature this species further differs from P benson in the median parietal fold being interrupted and much slighter, the branched portion being relatively much more elevated, the lower free horizontal parietal told is very short, so that this part of the armature, while differing from the typical forms of P bensons, recalls the condition which

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obtains in the vir. breinplua of that species. The specimen figured, which I received from the late Miss Linter, was labelled with the hibitat, "Moulmain" It measures: major dram 16, mirror 13 mm.. alt 6 mm. Another shell from the same source measures 12 25, 10.5, and 5 mm respectively.

Var. fusca, Gude.

Plectepylis lin'erae, var. fusca, Gude, Science Gossip, & s. v, 1898, v 170. fig 89

Differs from the type in being unicolorous dark brown, a little piler below, in being thinner in texture, and in the peristome being hyid

Major diam 11.5-16, minor 125-135 mm; alt 55-6 mm

Hab Burma

A shell in Mr Ponsonby's collection, which was labelled P. pachustoma, var minor, I was unable to separate specifically from P lintera. It differs, however, from the typical form of

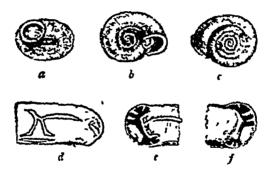


Fig 63 -Plectopylis lintera, var fi sea

that species in being of a unicolorous dark brown in the personne being livid instead of white, and in the shell being thinner in texture. The armatures are identical in both forms. Lix 65% shows the parietal wall with its folds, while fig. 63% gives the enterior, and fig. 68% the posterior aspect of both sets of harriers (enlarged). Ligs 68% are show the entire shell (natural size)...

Four specimens from the Attaran Valley, in the Theolall collection, British Museum, agree with Mr. Ponsonbia at il,

except in size, measuring 16 mm, in dirmeter.

115 Plectopylis anguina, Gould

Melit eres ma, Gould, Proc Boston Soc. Nat. Hist in 1817, p. 218.

Hard v. & Theolaid, Conch. Ind. 1870, pl. 15, t. 3.

Rectify of command Stolic to J. A. S. B. xl, 1871, p. 218. P. 38. xl, 1871, p. 218. P. 38. xl, 1871, p. 218. P. 38. xl, 1872, p. 75, fig. 70 (shell and are cature).

Hely (Peertyphs) anymae, Nevill, Hand Lest, 1, 1873, p. 72.

Helix (Atopa (Plectopylis)) anguna, Tryon, Man Conch ser 2, 111, 1887, p 165, pl 35, fig 6

Plectopylis (s s) anguna, Gude, Science Gossip, N s vi, 1899 p 148

Original description.—"Testa sinistrorsa, distorta, planorboidea, glabra, fusco-castanea, infra radiatim flammulata, vix concava, spira planulata, anfr 5½ convexiusculis, ultimo ad peripheriam sub-angulato; apertura despecta, perobliqua, semi-elliptica, peristomate rufo, revoluto, callo angulato haud appresso, conjuncto, lamella alba secundum anfractum penultimum intro-volvente

"Diam 1 poll [=255 mm]; alt $\frac{1}{4}$ poll. [=625 mm]"

(Gould)

Hab Burma Manko, Tavoy (Vinton), Kuengan (Theobald),

Sgwagakın, Salween Valley (Coll Ponsonby).

By some authorities this species has been considered identical with *P bensoni*. It appears, however, to be perfectly distinct

The shell is sinistral, much flattened, discoid, varying in colour from corneous to dark chestnut, below it is usually paler and









Fig 69 -Plectopylis anguina

flammulated with dark chestnut; it is finely striated and decussated by microscopic spiral lines. The spire is depressed, the suture linear. Whorls 5½, regularly coiled, increasing slowly and gradually; slightly flattened above and rounded below. The list whorl is slightly angulated at the periphery, widening rather suddenly at the aperture, deeply deflected in front, and somewhat constricted behind the peristome. The umbilicus is extremely shallow, in a specimen in my collection it is only 15 mm in depth. The aperture is nearly horizontal, cordate; the peristome livid or pale brown, a little thickened and much reflexed. A

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sinuous raised ridge on the parietal wall at the aperture connects the margins of the peristome; at the junctions above and below, however, there are slight notches. The armature is similar in most respects to that of *P. repercussa*, but it is less solid and heavy, the lower arm of the bifurcation on the parietal wall is longer than the upper, and the thin free horizontal fold near the lower suture is not united to the ridge at the aperture and does not proceed beyond the lower arm of the bifurcation as is the case in *P repercussa*. The upper fold of the palatal armature is much shorter than in that species, terminating posteriorly at the same point as the shorter upper arm of the parietal bifurcation, the second and fifth horizontal palatal folds are much shorter anteriorly than in *P. repercussa*, while the vertical palatal lamina (the fourth) is broader, but less stout and less inclined towards the aperture than in that species

The specimen shown in figs 69 d and e is from Moulmain and is in my collection. It measures major diam 28, minor 22, alt 75 mm. Fig 69 f shows the posterior aspect of its parietal and palatal aimature. Figs 69 a-c are reproduced from photographs (natural size) of Gould's types in the New York State Museum, Dr. Bagg having supplied the following notes. "Heliv anguma, Gould. Catalogue number, 251; Original number, A 558. The shell is somewhat banded by brownish and white

alternating, but not in all specimens."

116 Plectopylis bensoni, Gude, nom. mut

Helix achatina (Gray), Pfeiffer, Zeits Malak ii, 1845, p. 86, Benson, A. M. N. H. ser 3, ii, 1859, p. 59, Kobelt, Ill Conch. Buch, ii, 1879, pl. 71, fig 9.

Helix (Plectopylis) achatina, Benson, A. M. N. H. ser 3, v, 1860, pp. 244, 245, Nevill, Hand List, 1, 1878, p. 71, Godwin-Austen, P. Z. S. 1874, pl. 74, fig 6 (armature), J. A. S. B. lviv, 1895, pl. 7, fig 5 (animal), Tapparone Canefri, Ann. Mus. Civ. Genova, ser 2, vii, 1889, p. 47.

Helix (Atopa (Plectopylis)) achatina, Tryon, Man. Conch. ser 2, iii, 1887, p. 165, pl. 35, figs 3-5, 7, 8.

Plectopylis achatina, Stoliczka, J. A. S. B. xl, 1871, p. 221, pl. 15, figs 1-3 (aniatomy), Pilsbry, Man. Conch. ser 2, ix, 1894, p. 145, figs 1-3 (aniatomy), Pilsbry, Man. Conch. ser 2, ix, 1894, p. 145, figs 1-3 (aniatomy), Pilsbry, Man. Conch. ser 2, ix, 1894, p. 145, figs 1-3 (aniatomy), Pilsbry, Man. Conch. ser 2, ix, 1894, p. 145, figs 1-3 (aniatomy), Pilsbry, Man. Conch. ser 2, ix, 1894, p. 145, figs 1-3 (aniatomy), Pilsbry, Man. Conch. ser 2, ix, 1894, p. 145, figs 1-3 (aniatomy), Pilsbry, Man.

Gude, Science Gossip, n s v, 1898, p 114, figs 80-82 Plectopylis (s s) achatina, Gude, op cit vi, 1899, p 148

Original description —"T sinistrorsa, latissima umbilicata, depressissima, discoidea, lærigata, superne rufa, albido maculata et flammata, basi pallida, spira plana, medio vix elevatiuscula, aufr 6½ subplanulati, ultimus a latere subcompressus, antice subito deflexus; apertura subhorizontalis, oblongo-subcircularis, perist. fusculum, undique expansum et reflexum, marginibus lamina prominente, lamellam profunde intrantem emittente junctis

"Diam major 31, minor 24, alt. 81 mill." (Pfeiffer.)

Hab Burma: Mergui (Philippi); Moulmain (Stoliczka, Theo-

bald, Fea); Nattoung (Theobald); Pha-thinz (Hungerford).

The name Helix achaina having previously been employed (Potiez & Michaud, Galerie de Douai, 1, 1838, p 68), it is necessary to apply another designation to the shell hitherto known as Plectopylis achaina, and I have much pleasure in associating with it the name of the naturalist who created the genus Plectopylis

The shell is sinistrorse, disk-shaped, very widely umbilicated, of various shades of chestnut, usually paler and sometimes flammulated below, irregularly and finely striated. The apex is usually, but not invariably, raised slightly above the plane of the whorls. There are six or six and a half whorls, which increase gradually, and are more or less flattened above and tumid below; the first three and a half are smooth or nearly so, while the next two are

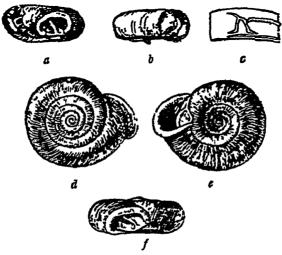


Fig 70 -Plectopylis bensone

somewhat coarsely structed and strongly decussated by spiral lines, less distinct on the upper side of the last whork obsolete at its side, but reappearing in the umbilical region. The last whorl is bluntly keeled above and subangulated at the periphery, this whorl suddenly widens at the aperture where it is deeply deflected. The aperture is almost horizontal, elliptic cordate, while the peristome is thickened and strongly reflected, hvid or purplish-brown in colour, never white, the margins are united by a raised sinuous ridge, slightly notched at the junctions above The parietal armature is of the same type as that of and below P repercussa, but the lower arm of the bifurcation is the longer of the two (see fig. 70 c, which shows part of the parietal wall with the posterior portion of its armature), and the lower free horizontal fold close to the lower suture does not reach as far as the apertural ridge, and does not extend beyond the lower arm of the bifurcation and its posterior support Fig 70 a gives the anterior 140 HELICIDÆ

and fig. 70 b the posterior aspect of both armatures. The palatal armature is also similar to that of P. repercussa, but the first horizontal fold is shorter in the present species correspondingly with the reduction in the upper arm of the bifurcation of the parietal armature, while the vertical lamina is less strong and its edge less thickened Plectopylis repercussa is, generally speaking, a more solid and larger shell, always lighter in colour than P. bensoni, while its white peristome will at once distinguish it from the latter species. The lower horizontal parietal fold in P. repercussa is always distinctly united to the apertural ridge, whereas in P. bensoni this fold is not visible from the aperture. That these characters are constant, I have reason to believe from having opened sixteen or eighteen specimens without finding any variation in these respects. The specimen shown in figs. 70 a and b measures: major diam. 22, minor 17, alt. 7 mm, while the

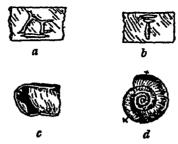


Fig 71 -Plectopylis benson, juv

one shown in figs 70 d-f measures 27 21 8 mm; both are from Moulmain, and are in my collection. Another specimen in my collection shows no trace of the ridge at the aperture, but is in all other respects like the inature shells. In figs 71 a-d I have shown an immature shell, received from Mr J E Cooper, of Highgate; it has only four whorls completed, and is only furnished with the posterior portion of the parietal armature (see fig 71 a), but the palatal armature is quite complete, though correspondingly reduced in size, an earlier set of barriers is



Fig 72 -Plectopylis bensons, jur

found three-quarters of a whorl further back, the parietal folds of this set have been entirely absorbed, but of the palatal folds there are only three, the second and third horizontal, and the vertical fold; this is shown in fig 71 b in situ, while its anterior aspect is given in fig 71 c, the two arrows in fig 71 d indicate the respective positions of the two sets of barriers. In the

McAndrew collection, University Museum of Zoology, Cambridge. is a tablet with three shells, labelled "Nanina lacythis, type, Benson Coll", but subsequently altered in pencil to "P. leiophis (?)" I refer these specimens without hesitation to immature forms of Plectopules benson: one of them is shown in figs 72 a-c This specimen has four and a half whorls completed, and possesses the immature barriers half a whorl from the aperture The parietal armature is composed of only a crescent-shaped vertical lamina, corresponding to the upper and lower bifurcation of the main horizontal fold (see fig 72 b), while the palatal armature, as it is seen from the outside through the shell-wall, is shown in fig 72 c (enlarged), there are only three folds, a c the second and third horizontal ones, which are very short and deflected posteriorly, and the vertical fold, with a posterior ridge or support below, the arrow in fig 72 a indicates the position of this set of barriers The specimen measures 11. 10.6 mm; the first three and a half whorls are ribbed, the last whorl only showing spiral sculpture The cuticle is plaited transversely, and the whorl is angulated above, at the periphery, and below it; the periphery showing traces of a fringe of laciniæ. Below the aperture are found some traces of another set of barriers The other two specimens referred to measure 9 5 8 5 5 mm: the armsture is one-half of a whorl from the aperture. and there are traces of an older set one-quarter of a whorl farther back, the upper and the peripheral keels are provided with a fringe of lacinim. These immature specimens are very interesting and instructive, as they tend to indicate the various stages through which the armatures pass in their evolution from simple to complicated barriers

Stoliczka remarks (J A S.B xl (1871), p. 221) that Pleatopylis achatina [bensom] is "extremely common on all the limestone hills about Moulmain Among thousands of specimens not one dextrorse variety was met with The larger specimens I have seen measured in the longer diameter 35 millimetres, but specimens of half that size, and even smaller than that, often have all the appearance of being full-grown." As it is so abundant a species, it is not surprising that it is so frequently seen in collections. It is the most variable of all the species of

Plectopylis

The following varieties may be distinguished.

Var repercussoides, Gude

Plectopylis achatina, var repercussoides, Gude, Science Gossip N s v, 1899, p 333

This variety is intermediate between typical P benson and P repercussa, having the contour and the white peristome of the latter, but the armature of the former. It further differs from typical P benson in being angulated above at the periphery and below around the umbilicus, a feature it shares with P repercussa

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In colour the shell is chestnut-brown above, while the umbilical region is white, in which it resembles the variety infrafasciata. The present variety is based on a shell in my collection, but the Museum of Mason's College, Bilmingham, possesses three specimens identical with it

Var infrafasciata, Gude.

Heliv achatina, Pfeiffer, Conch-Cab, Heliceen, i, 1848, p 382, pl. 66, figs 28-30, Hanley & Theobald, Conch Ind 1870, pl 57, hgs 8, 9

Plectopylis achatma, var infrafasciata, Gude, Science Gossip, N s v, 1898, p 133, fig 84

Differs from the type in being more rounded in contour, and in the last whorl not widening at the aperture, the umbilicus is more shallow and the peristome more flattened and reflexed, the right margin is a little depressed, the shell is blackish or purplish brown above, with a white or bluish white band below, reaching from the umbilical angulation to the lower suture, the peristome is purplish brown, the left margin being paler

Major diam 22, minor 18 mm, alt. 8 mm Hab Burma Moulmain, Mergui (Philippi)

Plectopylis benson, var infrafasciata, is still darker than the

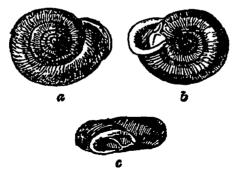


Fig 73 -Plectopylis bensoni, var infrafasciata

variety obesa, being of a blackish or purplish brown. Like that variety it is rounded in contour, but it is larger and more flattened; while the umbilicus is a little more shallow and the peristome more flattened and reflexed than in the type. The peristome is livid purplish in colour, the left margin being paler and the right margin a little inflected. A whitish or bluish-white band below reaches from the umbilical angulation to the lower suture. The armature is similar to that of the type, but the horizontal parietal fold near the lower suture is visible from the aperture and terminates close to the ridge. The specimen figured was received by me from the late Robert Cairns. Four specimens in the collection of the late E. L. Layard and one specimen in the MeAndrew collection (the latter labelled "Plectopylis refuga") all belong to this form. The late Robert Cairns also sent me for

inspection a specimen measuring 21 mm in diameter, and four immature shells, in various stages of growth, all showing sets of barriers similar to that of the immature *Plectopylis bensoni* shown in fig $71\,\alpha$

Var. castanea, Gude.

Plectopylis achatina, var. castanea, Gude, Science Gossip, N. s v, 1898, p 134, fig 86

Differs from the type in being smaller in diameter and proportionately higher, it is darker in colour, being blackish-brown above and a little paler below. It resembles the variety obesa in being more rounded in outline, in the last whorl not widening suddenly at the aperture, in the sloping underside, and in the median parietal fold not reaching quite to the apertural ridge, the last 2½ whorls are more strongly decussated above and below than in any other form. An obsolete keel is visible at the periphery.

Major diam 21, minor 19-min, alt 8 mm

Hab. Burma

The variety castanea is darker than the other forms of P bensoni

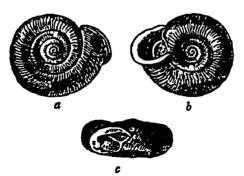


Fig. 74 -Plectopylis bensons, var castanea.

except the variety infi afasciata, being of a blackish-brown above, a little paler below. It is, however, larger than that variety, and does not possess the white band below; the umbilicus is also much deeper, the shell being in that respect more like the variety obesa, which it also resembles in the sloping underside; the aperture is proportionately larger than in that variety. The spiral lines on the last 2½ whorls are visible without the aid of a lens. The specimen figured was received by me from the late Miss Linter.

Var obesa, Gude

Plectopylis achatina, var. obesa, Gude, Science Gossip, n s v, 1898, p 115, fig 83

Differs from the type in being more compressed and higher in

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proportion to the diameter; in the last whorl not widening suddenly at the aperture, and in the lower side sloping from the periphery to the umbilical angulation; the right margin of the peristome is depressed; the umbilicus is deeper, and the horizontal median parietal fold does not quite reach the apertural ridge. The shell is darker in colour and more strongly ribbed

Major diam. 19. minor 15 mm.; alt 7 mm.

Hab Burma Moulmain

The variety obesa is darker in colour than the type, being of a fuscous chestnut—It is more compressed and distinctly ribbed, the shell is higher in proportion to the diameter, and the umblicus

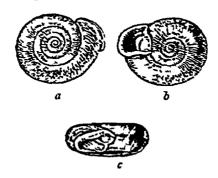


Fig 75 -Plectopylis bensoni, var obesa.

is deeper; the last whorl does not widen suddenly, and the right margin of the peristome is depressed, the aperture being consequently somewhat ear-shaped; the lower side slopes from the peripheral region to the umbilical angulation. The armature does not differ materially from that of the type, except that the median horizontal parietal fold does not quite reach the apertural ridge. Six specimens were received by me from the late Miss Linter, five of these being more or less decorticated.

Var. venusta, Gude

Plectopylis achatina, var venusta, Gude, Science Gossip, n. s v, 1898, p 134, fig 85

Differs from the type and the other varieties in being smaller. It resembles the variety obesa in the deeper umbilious, in the sloping underside, in the comparative height of the shell and in the median parietal fold not reaching the apertural ridge, but the last whorl widens more, as in the type. In colour it is pale yellowish-white flammulated with chestnut above and at the side. The peristome is livid brown, the left margin paler, the right margin a little depressed

Major diam. 17, minor 14 mm.; alt 7 mm

Hab Burma.

The variety *ienusta* is smaller than any form of *P. bensoni* I have seen. It is pale yellowish-white in colour, flammulated with

chestnut above and at the sides The specimen figured was received by me as *Plectopylis pachystoma* Theobald; but as I am not aware that this name was ever published I consider it expedient to discard the name altogether A specimen in the collection of the



Fig 76 .- Plectopylis bensoni, yar venusta

late Dr. von Mollendorff, likewise labelled P. pachystoma, I am unable to separate from the present variety, although it shows no flammulation and the peristome is white; in other respects it is identical

Var breviplica, Gude.

Plectopylus achatina, var. breviplica, Gude, Science Gossip, n s v, 1898, p 134, fig 87

Differs from the type and all the other known varieties by the much more shallow umbilicus. It resembles the variety infrafasciata in outline, but it is of a uniform dark brown, with a somewhat polished surface, and the last whorl widens more suddenly at the aperture. The basal horizontal parietal fold is very short, not extending on either side beyond the two lower arms of the main median fold; the first palatal horizontal fold is considerably more elevated than in the other forms, and is bilobed; the second and third horizontal folds are also more elevated, the latter fold has a short fold above its posterior portion; the vertical lamina is also more elevated, and in place of the usual denticle posteriorly to its lower extremity is an elevated ridge, quite united to the plate.

Major diam. 19, minor 16 mm; alt 7 mm.

Hab. Burma.

Plectopylis bensoni, var. breviplica has a much shallower umbilicus, and is thinner and more fragile than any other form of P. bensoni known to me. It is somewhat like the variety infrafasciata, but it is devoid of the white band on the lower side; the last whorl also widens a little more than in that variety, but is less deflected, and the aperture is more sloping from top to base; there are also important differences in the armature, the lower horizontal parietal fold being very short, not extending on either side beyond the

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two lower arms of the main fold (see fig. 77 c, which shows part of the parietal wall with its folds) Of the palatal armature, the first, second, and third folds are more elevated; the first is bilobed. and above the posterior portion of the second occurs a very short additional fold. The vertical lamina is also more elevated, and in

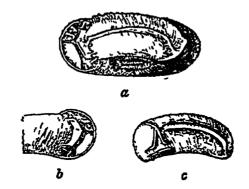


Fig. 77 -Plectopulus bensons, var breviplica

place of the usual denticle posteriorly to its lower extremity is found an elevated ridge quite united to the plate. Fig 77 a shows the anterior and fig. 77 b the posterior aspect of both armatures. The specimen figured is in the collection of Mr. Ponsonby.

117. Plectopylis repercussa, Gould

Helix repercussa, Gould, Proc Boston Soc Nat Hist vi, 1856, p 11, Hanley & Theobald, Conch Ind 1870, pl. 13, fig 4 Helix (Plectopylis) repercussa, Stoliczka, J. A. S B xl, 1871, p 218, Nevill, Hand List, 1, 1878, p 72
Plectopylis repercussa, Gude, Science Gossip, N s v, 1898, p 74, Plectopylis (8. 8) repercussa, Gude, op cit vi, 1899, p 148

Original description —"T. sinistrorsa, discoidea, supra planulata, infra concava, plicato-striata et lineis volventibus superne insculpta, castanea; anfr. utroque 6+, ultimo vix angulato, prope aperturam deflecto; apertura despiciens, oblique lunata, peritremate reflexo, postice callo angulato juncto, lamellis palatinis duabus intro volventibus, quarum una ad angulum inconspicua

Diam. 1 [=25 5 inm.], alt 3 poll. [=775 mm.]"

Hab. Burma. Tavoy and Mergui (Benjamin), Moulmain

(Theobald, Stoliczka).

The diagnosis by Gould is somewhat vague, and as the species was not illustrated, subsequent authors considered it to be synonymous with P. benson, from which species, however, it differs in outward appearance as well as in its armature The shell is sinistrorse, disk-shaped, pale corneous, finely striated, the upper side being strongly decussated by spiral lines, almost



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arm, provided anteriorly at the lower extremity with a short, abruptly descending horizontal ridge; the fold then rises obliquely for a short distance, and finally bifurcates; the lower arm of the bifurcation the shorter, and descending almost vertically, it is provided posteriorly with a short horizontal ridge at its lower extremity, the upper arm at first ascends obliquely, then proceeds horizontally close to the suture, and gradually attenuates these complicated structures, there is a free, thin, horizontal fold close to and parallel with the lower suture, and extending from the aperture to a little beyond the lower arm of the bifurcation and its posterior support (see fig 78 c, which shows part of the At the aperture this fold is distinctly united to the parietal wall) transverse sinuous ridge (see fig. 78 d) The palatal armsture consists of first, a strong long horizontal fold near the suture and parallel with it, as well as with the posterior portion of the upper arm of the parietal bifurcation, with which it terminates at the same point postenorly, secondly, a shorter, but much stronger and broader horizontal folds which deflects with a sharp curve posteriorly, having a little above its posterior termination, and almost in a line with its anterior portion, a slight elongated horizontal denticle, thirdly, a very short, but strong and broad crescent-shaped fold, deflected at both extremities, fourthly, facing the concave side of the last-mentioned fold, is a very strong and broad vertical lamina, strongly inclined towards the aperture, with a much reflected and thickened edge; this lamina intercalates between the two lower arms of the parietal armature; on the posterior side of the lamina and near its lower extremity occurs a stout little denticle, and a little lower and still farther back is found a slight elongated swelling, not amounting to a fold or denticle (yet present in all four mature specimens, as well as in an immature one, examined by me), fifthly, a thin horizontal fold, the anterior part straight, but curved in the posterior half, with the concave side facing the vertical lamina (see fig. 78f, enlarged, which shows the inner side of the palatal wall with its folds and denticles). Figs 78g-i (also enlarged) show an ummature specimen of 51 whorls, in Mr. Ponsonby's collection, the armature is almost identical with that of the mature specimens, but the main median parietal fold is very short and does not rise from the aperture, while the denticle in front of the lower part of the palatal vertical lamina is very strongly developed, and it is united to it so as to form a steep ridge A second set of barriers, identical in every respect except in being a little smaller, occurs in this specimen I of a whorl further back. The mature specimen shown in fig 78d is also in the collection of Mr. Pousonby and measures. major diam 31, minor 24, alt 9 mm; while the immature specimen measures 17 mm in diameter. specimens in my collection measure respectively 29 - 23 · 9 mm , 25 20 85 mm; 23; 18.7.5 mm The types of the species are in the New York State Museum, at Albany, N.Y., and are shown

in figs 78 a-c, which are reproduced from the photograph kindly supplied by Dr. Merrill The following particulars are taken from Dr. Bagg's notes which accompanied the photographs: "Heliv repercussa, Gould Burmah Catalogue No, 236, original No, A 564 Major diameter, $\frac{1}{6}$ inch [=28 5 millimetres], minor diameter, $\frac{\pi}{6}$ inch [=22 millimetres]; altitude, $\frac{\pi}{16}$ inch [=8 millimetres]; greatest diameter of aperture, $\frac{\pi}{16}$ inch [=11 millimetres]" Gould states that the species was taken in the Mergui Archipelago

Subfamily CAMÆNINÆ.

Genus CAMÆNA (Albers), Pelsbry.

Camæna, Albers, Die Heliceen, 1850, p 85, in part, Martens, Die Heliceen, ed 2, 1860, p 165, Pilsbry, Man Conch ser 2, vi, 1891, p 197, vii, 1893, p 205, ix, 1894, p 101, ibid, Proc Acad Nat. Sci Philadelphia, 1892, p 398 (anatomy)

Eucochlias, Theobald in Nevill, Hand List, 1, 1878, p 81

TIPE, Helix cicatricosa, Muller.

Range Southern China to Burma and southward.

"Shell rather large, varying from depressed-globose or conoidal to elevated and short pupiform; dextral or sinistral, solid, yellow or brown usually encircled by chestnut bands or lines. Surface closely malleated or wrinkled all over, whorls about 5-5½, the upper ones flattened, the last subglobose or carinated; peristome expanded or reflected, its ends not converging, columellar margin dilated over or partly over the narrow umbilicus. The columella is rounded The nuclear shell is rather large (about one-fifth the diameter of the shell), consisting of 2-2½ whorls, its junction with the aftergrowth marked by a (generally) distinct line. The young shells are acutely carinated

"Animal having the sole very indistinctly tripartite, lateral edges of foot with no trace of a foot-margin, sides of foot granulated in irregular pattern, the tail rather long, rounded above, with an indistinct slightly impressed longitudinal median line, anteriorly there are a few indistinct longitudinal grooves from mantle to head. Mantle-margin with a small triangular right body-lappet,

and a longer left one

"Jaw arcuate, strong, typically with numerous, strong, separated ribs

"Dentition Central and lateral teeth having the mesocones only developed, the cusps large, cutting-points small Marginal teeth with a long, oblique, bifid mesocone united at the base with the ectocone, which becomes bifid on the outer teeth

"Genitalia Vestibule short, penis stout, continued above in an epiphallus, in which the retractor and then the vas deferens is inserted, and terminating in flagellum; penis corrugated within,

and having a large papilla at its apex Vagina stout, bound to the body-wall by a band of muscles, duct of the spermathera long" (Pilsbry)

118 Camæna noetlingi, von Martens

Helix (Camena) noetlings, von Martens, Nachr Blatt Deuts Malak Ges xxix, 1897, p 178 Helix (Camæna) noetlings, von Martens, Arch Naturges 1899, p 32, pl 4, fig 1

Original description —"T. sinistrorsa, anguste umbilicata, subdeplessa, confertim tenuiter striolata, fuscescenti-fulva, unicolor; anfr 4½, sat celeriter crescentes, priores 1½ læves, supra valde convexi, sequentes leviter convexi, spiram depresse conoideam efficientes, ultimus ad peripheriam subangulato-rotundatus, infra magis convexis. Apertura valde obliqua, lunato semiovata, peristomate expanso, crassiuscule albolabiato, margine supero paulum arcuato, rapide in basalem valde arcuatum transcunte, marg. columellari arcuatim ascendente, superne dilatato et reflexo, umbilici partem tertiam tegente, callo parietali tenuissimo, fauce tuscente

"Diam. maj 28, min. 24, alt. 21, apert. diam. 18, lat. obliqua 15 mm." (von Martens)

Hab. Upper Burma, Pyawbwć, Yamettsin District (Nothing)

The author states that Camæna noetlings resembles C. cicatricosa, but lacks the sculpture of that species. The soft parts were examined by Herr Fr Wiegmann who stated that they indicate an odontognathous Helicoid with Haplogonous genitalia, agreeing with Camæna.

119 Camena ochthoplax, Benson.

Hehr ochthoplar, Benson, A M N H ser 3, vi, 1860, p 190, Hanley & Theobald, Conch Ind 1870, p 13, pl. 26, fig 4 (octhoplar), Blanford, J A S B xxxix, 1870, p 24
Nanna (Oxytes) ochthoplar, Tryon, Man Conch ser 2, 11, 1886, p 129, pl 43, fig 30, p Kobelt, Conch Cab, Helix, v, 1904, p 1145, pl 287, fig 1
Helix (Camæna) ochthoplar, Pilsbry, Man Conch, ser 2, vi, 1891, p 202, pl 61, figš 23, 24
Helix (Eucochleas) ochthoplax, Nevill, Hand List, 1, 1878, p. 81, Godwin-Austen, J A S B lxiv, 1895, p 152, pl 7, fig 1
Helix (Phania) ochthoplax, Martens, Arch Naturges lxv, 1, 1899, p 33
Camæna ochthoplar, Pilsbry, Man Conch ser. 2, 1x, 1894, p. 104

Original description — "Testa profunde et anguste subobtecte umbilicata, depressa, superne convexa, subtus convexiore, soliduscula, oblique rugoso-striata, obsolete granulata, rugis nonnullis obsoletis spiralibus distantibus subtus confertioribus decussata, rufo-castanea, spira valde obtusa, sutura lineari, demum impressiuscula; anfractibus 5 planiusculis, ultimo antice convexiusculo;

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peripheria carinata, carina antice mitiore; apertuia obliqua, quadrato-lunari, peristomate expanso, albido, marginibus callo tenui arcuato junctis, basali reflexiusculo, incrassato, antice arcuato, columellari brevi, declivi, reflexo, sinuato, umbilicum subtegente.

CAMENIA.

"Diam. maj 54, minor 46, axis 26 mill" (Benson)

Hab India, Moyang, Khasi Hills, and Asaloo, North Cachar (Godwin-Austen); Upper Burma. Maingkhwan, Hukong Valley

(Notling) Pegu?

The type was said to be from Pegu, but Blanford thought the locality was in all probability erroneous, the shell having never been met with either by Theobald, Fedden, or himself. Nevill places the following note by Blanford on record,—"A true Helix, nearly black, with pale tawny markings, surface granulate; jaw grooved"

The species resembles C. illustris in its general characters, but is more depressed and umbilicated. The sculpture is less distinct, while the lip is expanded but not reflexed. Pilsbry states that as C ochthoplax is a genuine C amæna of the cicatricosa type, E ucochhas

must be regarded as an absolute synonym of Camana

120. Camæna saturnia. Gould.

Helix saturnia, Gould, Proc. Boston Soc. Nat. Hist. 11, 1845, p. 98, 1bid., Otia Conch. 1862, p. 198, Hanley & Theobald, Conch. Ind. 1870, pl. 25, fig. 3

Helix (Phania) saturnia, von Martens, Die Heliceen, ed 2. 1860,

n 157

Helix (Camana) saturnia, Pilsbry, Man Conch ser 2, vi, 1891, p 203, pl 60, fig 5

Hemsplecia? saturma, Godwin-Austen, Moll Ind 11, 1898, p 78 Camana saturma, Pilsbry, Man Conch ser 2, 1x, 1894, p 104

Original description.—" Testa magna, lenticularis, pallide rubido-cornea, ad peripheriam costato-carinata, late et profunde umbilicata; anfractibus 5 planulati, spira depiesso-conica, sutura profunda, marginata; subtus convexa, costulis obsoletis cincta; apertura ampla, rhomboidea, peristomati revoluto"

"Major diam 47, minor 39. alt. 28 mm; apert lat 20, alt

15 mm " (Gould)

Hab Burma · Tavoy (Mason), Tenasserim (Theobald)

Shell perspectively umbilicated, depressed-conoid, distantly plicate-striate, buff corneous. Spire depressed, suture shallow, apex obtuse. Whorls 4½, granulated, increasing rapidly, subplanate, slightly sulcate above the suture, the last obtusely keeled, slightly compressed above and below the keel, the latter half becoming more convex above towards the mouth, slightly dilated at the aperture, the base flattened, sloping from the periphery to the umbilicus, becoming more convex towards the mouth, angulated around the deep funnel-shaped umbilicus and exhibiting

traces of spiral sulci; aperture subrhomboid, peristome pinkish, margins approaching, reflexed, upper and outer curved, basal nearly straight, columellar thickened, strongly reflexed and

triangularly dilated over the umbilious

The species was originally found at Tavoy, but a specimen is in the British Museum collection, taken by Theobald at Tenasserim. Although this shell is in a worn condition and appears to have been varnished, it has enabled me to amplify Gould's original meagre description. Opinions as to its systematic position have been considerably at variance. Von Martens referred the species to Phania [=Pyrochilus], and Godwin-Austen to Hemiplecta, whereas Pilsbry places it (correctly I think) in Camæna. Its nearest ally appears to be Camæna vanbuensis, Smith.

A second specimen in the British Museum, forming part of the Cuming collection, is also dead and worn, but has been preserved in its natural condition. The base is ornamented with spiral sulci and the shell is considerably larger than the one in the Theobald collection, measuring —Major diam 53, minor 45,

alt 32 mm.

Genus OREOBBA, Pilsbry

Orcobba, Pilsbry, Man Conch ser. 2, 1x, 1894, p 109 (as subgenus? of Obba)

Janua, Albers, Die Heliceen, 1850, p 124, non Janua, Leach, 1813 (Crustacea), Oken, 1815 (Acalepha), Schumacher, 1817 (Mollusca)

TYPE, Helix codonodes, Pfeiffer.

Range Nicobar Islands

"Shell globose-conoidal, bullet-shaped, composed of about 5 whorls which are carnated in mature shells; the embryonal portion not differentiated; last whorl deflexed in front. Surface shining, microscopically spirally striated. Aperture truncate-rounded, entire lip well reflexed, at the columella expanded partly over the narrow umbilicus, and armed with a callous tooth on the inner edge." (Pilsbry)

Animal unknown.

121 Oreobba codonodes, Pfeiffer

Helix codonodes, Pfeiffer, P Z S 1846, p 112, Reeve, Conch Icon vii, 1851, pl 22, fig 91, Pfeiffer, Conch-Cab, Helix, ii, 1853, p 232, pl 111, figs. 15, 16, iii, 1854, pl 128, figs 3, 4, Kobelt, Ill Conchyl Buch, ii, 1879, pl 78, figs 19, 20

Helix (Janua) codonodes, Albers, Die Heliceen, 1850, p 124, Nevil, Hand List, i, 1878, p 115

Stylodonta (Janua) codonodes, Chenu, Man Conchyl 1, 1860, p 451, fig 3363

Helicostyla (Janua) codonodes, Mürch, Journ Conchyl xx, 1872, p 312 Helia (Obba) codonodes, Pilsbry, Man Conch ser. 2, vi, 1891, p 236, pl 53, figs 8, 9, 10 Obba (Orcobba) codonodes, Pilsbry, Man Conch ser. 2, 1x, 1894, p 109, pl 19, fig 11

Original description.—"T umbilicata, globoso-conoidea, solida, oblique striatula, lineis spiralibus confertis subtilissime sculpta, nitida, alba vel straminea, castaneo 1–2 fasciata, spira campanulata, apice obtusiuscula; anfr 5½ vix convexi, ultimus antice descendens, basi juxta aperturam gibboso-subconstrictus, apertura obliqua, subquadrangulari-rotundata, perist incrassatum, reflexum, marginibus subapproximatis, callo nitido junctis, columellari intus protuberantia dentiformi munito, extus dilatato, patente, sinuoso

"Diam may 20, min 17, alt 17 mill" (Pfeiffer.)

Hab Nicobar Islands Car Nicobar (Kydlerup), Camorta, Great Nicobar (Roepstorff, Wood-Mason, Stoliezka, Philippi), Kondul

(Roepstorff, Wood-Mason, Stoliczka)

The species varies considerably in stature, the height of some specimens equalling the major diameter. Morch describes three varieties minor, subcylindrica (height 27 mm), and edentula (height 28 mm), while Godwin-Austen enumerates in addition efasciata, subcarinata, and albolabris, all nomina nuda of Nevill Morch also mentions a unicolorous form from Car Nicobar, which is probably Nevill's efasciata

Genus PLANISPIRA, Beck

Planuspira, Beck, Index Moll 1838, p 29, Pilsbry, Man Concheser 2, 1x, 1894, p 110

Subgenus TRACHIA, Albers

Trachia, (Albers) von Martens, Die Heliceen, ed 2, 1860, p 160, Stoliczka, J. A. S. B. xl, 1871, p 223 (anatomy), Pilsbry, Man Conch ser 2, ix, 1894, p 114, pl 32, figs 44, 45, pl. 34, figs 4-6, pl 42, fig. 39 (anatomy)

Eurystoma, Albers, Die Heliceen, 1850, p 126 (non Rafinesque, 1818)

Type, Helix asperella, Pfeiffer

Range India, Burma, Ceylon, Mergui Archipelago, Andaman Islands

"Shell varying from discoidal to depressed-globose, umbilicate, the surface rather roughly sculptured, hairy when young, microscopically granulated, sometimes ribbed when adult, the apex typically showing no distinct sculpture. Last whork strongly deflexed in front. Aperture very oblique, small, the lip well expanded, reflexed below, the terminations approaching and sometimes connected by a raised callus.

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"Animal (of P delibrata) having the left body-lappet of the mouth represented by a simple thickening, right lappet reaching anteriorly over the back and rapidly becoming narrower below In P. vitiata the sole is distinctly tripartite

"Jaw arcuate, the entire anterior surface ribbed, the seven In P. vittata there are five very high median ribs stronger.

ribs, strongly denticulating the margin

"Radula (of P delibrata) very long, with 124 transverse rows of 22 (to 18) 20 . 1 . 20 18 (to 22) teeth Central and inner lateral teeth with a large mesocone and obsolete side cuttingpoints, outer laterals and marginal teeth with the ectocone developed In P vittata the formula is about the same, central and inner 14 laterals unicuspid, outer laterals with an ectocone At the 25th tooth the mesocone becomes bifid, and outwardly the bifid mesocone becomes shorter, the outermost marginals having three subequal cusps.

"Genitalia having the female side free from all accessory organs, the duct of the spermatheca very long Penis terminating in an epiphallus, near the root of which the retractor is inserted, epiphallus long, terminating in a short flagellum and the vas deferens. The genitalia of P. vittata are similar, penis with a spirally coiled flagellum. In P penangensis the penis bears an epiphallus ending in a short flagellum, and has an accessory

sack, perhaps an 'appendix'

"These shells are characterized by the deeply descending whorl at the aperture, and the strongly converging ends of the hp The anatomy is in essential agreement with either Chloritis or Planspua, although the strong ribbing of the jaw is most like the former group On the other hand, the general form of the shell, the deep descent of the last whorl to the very oblique aperture and the system of colouring, agree more nearly with The sculpture of the shell varies considerably in the Planispii a The more typical, such as fallaciosa, mlagirica, different species proxima, as well as vittata exhibit an apparently smooth apex; but proprique, tanquery, and a few others, show an excessively fine quincuncial punctulation of the apical whorls, such as occurs in Chloritis, in combination with the characteristic shell contour Until we know by the examination of numeious of Trachia species, how and to what extent the characters of jaw and genitalia are correlated with the above-mentioned shell structures, no consistent zoologist will be justified in drawing rigid lines of demarcation between the Chloritis and Planispin as of South-It is better to recognize frankly that in this area Eastern Asia the two groups are represented by some forms which, so far as shell characters show, are undifferentiated or separated by feeble characters only " (Pilsbry)

Stoliczka was of opinion that fallaciosa, ruginosa, nilagerica, vittata, provina, and crassicostata pertain to Planispira, s s , but Pilsbry refers them, correctly I think, to the subgenus Trachia

and I have followed him in this respect

122 Planispira albicostis, Pfeisfer

Helia albicostis, l'feiffer, P Z S 1860, p 134; Malak Blått vii, 1861, p 238

Helia (Trachia) albicostis, Pfeisser & Clessin, Nomencl Helic Viv. 1881. p. 181

Planispina (Trachia) albicostis, Pilsbry, Man Conch ser 2, ix, 1894, p 116

Original description — "T sublate umbilicata, depressa, tenuis, granulato-rugosa et pilis brevibus obsita, cornea, costulis obliquis albidis munita, spira parum elevata; anfr. 4 convexiusculi, ultimus superne subangulatus, supra angulum leviter sulcatus, antice deflexus; apertura perobliqua, ovalis; perist. tenue, marginibus fere contiguis, supero expansiusculo, basali breviter reflexo

"Diam maj 92, min S, alt 41 mill" (Pfaffe)

Hab India: Ahmednuggar

The species bears a superficial resemblance to P crasscostata, but in the latter the costæ are much more prominent and more widely spaced, the umbilicus is a little more contracted, and the periphery is acutely keeled, the keel being pinched above and below, and, owing to the strong costæ, it is crenulate, whereas in P. albicostis the periphery is simply angulated with a shallow furrow above it. The principal character, however, differentiating the two species is the presence in P. albicostis of crowded short hairs, placed on raised tubercles, arranged in rows which obliquely intersect the lines of growth.

123. Planispira asperella, Pfaffer.

Helix asperella, Pfeiffer, Symb Hist. Helic in, 1846, p 78, Reeve, Conch Icon vii, 1852, pl. 125, fig 752, Pfeiffer, Conch-Cab, Helia, ii, 1853, p 93, pl 82, figs 22-25; Hanley & Theobald, Conch Ind 1875, pl. 131, figs 8, 9, Kobelt, Ill. Conch Buch, ii, 1879, pl 76, fig 7

Helix (Planispira) asperella, Nevilla, Hand List, i, 1878, p 77

Helix (Planispira) asperella, Nevill, Hand List, i, 1878, p 77

Helix (Trachia) asperella, Martens, Die Heliceen, ed 2, 1860, p 160, Tryon, Man Conch ser 2, iv, 1888, p 62, pl 14, fig 58

Planspura (Trachia) asperella, Pilsbry, Man Conch ser 2, 1x, 1894, p 116, pl 19, fig 25 (shell); pl 34, fig. 4 (radula) Helix granifera, Benson, MS

Original description. — "T. umbilicata, depressa, granulis minutis undique exasperata, sordide albida, fascus rufis varie cingulata; spira vix elevata; anfr. 4 planiusculi, ultimus basi convexus, antice parum descendens, juxta umbilicum mediocrem, infundibuliformem subcompressus, apertura obliqua, lata, suborbicularis, perist undique expansum, marginibus approximatis, callo tenui junctis" (Pfeifer)

Major diam 13-16, minor 10-13, alt 6½-8¼ mm Hab India. Bundelkhund (Benson); Chanda (Newll)

Resembles Chloritis propinqua, Pfr., but may be distinguished by the roughened granules. The bands vary considerably, but the commonest form appears to be one with a dark, well-defined, supra-peripheral band, with two paler linear ones above it and four or five narrower and paler ones below it. Specimens without bands also occur

124 Planispira atkinsoni, Theobald

Helix athinson, Theobald, J A S B xxvin, 1859, p 305, Hanley & Theobald, Conch Ind 1870, pl 15, fig 9, 1874, pl 84, figs 2, 3

Helir (Trachia) atkinsoni, Tryon, Man Conch ser 2, iv, 1888, p 56, pl 12, figs 83-85

Planispu a (Trachia) athinsoni, Pilsbry, Man Conch ser. 2, 1x, 1894, p 116

Original description.—" Testa depressa, infundibuli-formeumbilicata, hineis transversis rugose striata, lineisque spiralibus obscuré leviter decussata, obtuse carinata, sordide albida (forsan in meliore specimine cornea) semitranslucente, sutura impressa Anfract 5 convexiusculis, apertura obliqua Perist leviter incrassato, non reflexo

"Diam 0 54, alt 0 20" (Theobald)

Hab Burma Moulmain (Atkinson); Tenasserim (Beddome)
A specimen collected at Tenasserim, received from the late
Col Beddome, enables me to supplement the above meagre
description, which must have been drawn up from a dead and

worn specimen

Shell moderately umbilicated, lenticular, pale fuscous, suture shallow but well marked, whorls 5, slightly convex, increasing slowly and regularly, the last slightly dilated at the mouth; the apical whorl shining, very finely rugosely striated, the striæ intersected by spiral lines, the transverse striæ becoming more accentuated and the spiral lines becoming deeply incised as the growth of the shell proceeds, the former being cut into subquadrate granules by the latter on the later whorls, giving the upper and outer side of the shell a rough rasp-like texture; the spiral incised lines cease somewhat abruptly a short distance below the periphery, and the transverse striæ also almost disappear on the underside, which is therefore almost smooth and shining. Aperture oblique, subquadrate-ovate, margins of the peristome approaching, upper sinuate, inflected, acute, the others slightly thickened and reflexed, outer regularly curved, basal almost straight, columellar ascending, umbilicus funicular.

Major diam 12, minor 10, alt 475 mm

The species, if correctly referred to Trachia is a somewhat abnormal member of this group owing to its coarsely granulated upper and lateral surface and the acute inflected upper margin of the peristome.

125. Planispira contracta. Benson.

Reha contracta (Hutton) Benson, A. M. N. H. ser. 3, xm., 1864. p 137; Hauley & Theobald, Conch Ind 1870, pl 55, hrs 6 & 0

Helia (Planispira) contracta, Nevill, Hand List, 1, 1878, p 77 Helm (Trachia) contracta, Pfeisser & Clessin, Nomencl Helic Viv 1881, p. 181.

Helix (Pleciotropis (Trachia)) contracta, Tryon, Man Conch. ser 2, w, 1888 p 65, pl 14, figs 61, 62

Planspua (Trachia) contracta, Pilsbry, Man Conch ser 2, 14. 1894, p 116

Original description: - "H testa late umbilicata, depressa, discordea, oblique striatula, lævigata, nitidula, albida, fascia rufescente supra angulum superiorem cincia, spira planata, apice vix elevatiore, sutura impressa, anfractibus 4, sensim accrescentibus, convexiusculis, ultimo supra peripheriam compressusculo subangulato, antice latiore oblique descendente, subtus convexo, umbilicum mediocrem, medio anguste exervatum, suturaque brevi profundo munitum circumstante, apertura valde obliqua, lata, ovato-lunari; peristomate non continuo, superne expansiusculo, subhorizontali, infra reflexiusculo, marginibus conniventibus approximatis

"Liam. maj 13, inin. 10, alt 4 mill" (Benson.)

Hab. India: Malwa, Pooree, Bhagulpur (Raban), Benares

(Manuaring), Dellu, Boorkee (Wood-Mason)

Apparently a rare species, intermediate between P mlagerica and P asperella

126 Planispira fallaciosa, Ferussac.

Helix (Helicella) fallaciosa, Férussac, Tabl Sist, Limaçons, 1821, p 43 (nom nud), ibid, Hist. Nat Moli 1832, pl 71, figs 1-3, Expl Pl p in (Live xxviii)

Helix fallaciosa, Pfeisfer, Symb Hist Helic. 11, 1842, p. 27, Deshayes in Férussac, Hist. Nat Moll 1, 1850, p. 54, Reeve, Conch Icon vii, 1852, pl. 85, fig. 459, Pieisier, Conch. Cab, Helix, 11, 1853, p. 93, pl. 82, figs. 18-21, Hanley & Theobald, Conch. Ind. 1874, pl. 85, figs. 8, 9

Helix (Camena) fallaciosa, Chenu, Man Conchyl 1, 1860, p 455, fig 3397

Helix (Trachia) fallaciosa, von Martens, Die Helic ed. 2, 1860, p 160

Helix (Planispira) fallaciosa, Nevill, Hand List, 1, 1878, p 77 Helix (Plectotropis (Trachia)) fallaciosa, Tryon, Man Conch ser 2, av. 1889, p 64, pl 14, figs 69, 69

Planispira (Trachia) fallaciosa, Pilsbry, Man. Conch ser 2, ix. 1894, p 116

Trachia falluciosa, Jousseaume, Mém Soc Zool France, vii. 1894. p 285

"II testa orbiculato-depressa, discoidea, lævigata, alba, fuscozonata; anfractibus planiusculis, ultimo cylindraceo, aliquando superne obtuse angulato; basi umbilico angusto perforato; apertura ovato-transversa; marginibus albis, reflexis, conjunctis
"Diam 17, axis 7 mm." (Deshayes)

The foregoing short diagnosis is amplified, from specimens in

my own collection, as follows.—

Shell perspectively umbilicated, depressed-conoid, from whitish to pale or dark fuscous, unicolorous or variously banded with brown., Apex scarcely raised, spire depressed, suture linear. Whorls 4-41, finely stricted, densely and minutely granulated. rather flattened above, subangulated at the periphery, convex below, angulated around the umbilious, the last suddenly dilated towards the mouth, shortly and abruptly descending in front, constricted below behind the peristoine Aperture ovaterotundate, margins approaching, united by a thin callus on the parietal wall; peristome rather thin, slightly expanded and reflexed, upper and outer margins curved, basal margin nearly straight, columellar curved, triangularly dilated and slightly overhanging the umbilicus, which shows nearly half of the penultimate whorl

Major diam 11-15 5, minor 9-12 5, alt. 5 5-8 mm.

Hab. India: Combatore (Leschenault); Trichinopoly (Blan-

ford) Ceylon (Templeton, Blanford, Nevill)

An elegant species, apparently not uncommon. It is unicolorous or variously ornamented with bands, the commonest form seems to be the one with a rather broad supra-peripheral band, one or two narrow ones above and several (five or six) below it; occasionally a broad infra-peripheral band occurs.

127. Planispira crassicostata, Benson.

Helix crassicostata, Benson, A M N H sei 2, n, 1848, p 159, Reeve, Conch Icon vii, 1852, pl 125, fig 747, Hanley & Theobald, Conch Ind 1870, pl 50, fig 10

Helix (Planisma) crassicostata, Nevill, Hand List, 1 1878, p 77

Hehr (Trachia) ruginosa, var crassicostata, Pfeister & Clessin, Nomencl Helic Viv 1881, p 181

Helia (Plectotropis (Trachia)) ruginosa, vai crassicostata, Tryon Man Conch ser 2, iv, 1888, p 64, pl 14, fig 67

Planispii a (Trachia) ruginosa, var crassicostata, Pilsbry, Man Conch ser 2, ix, 1894, p 116

Original description —"T. late umbilicata, depresso-planata, albida, plicis validis irregularibus obliquis, juxta carmam incrassatis, munita; spiræ apice lævigato, vix elevato, anfractibus 4 planatis, ultimo carinato, subtus valde convexo, antice deflexo, umbilico intundibuliformi; apertura subhorizontali, transverse ovato-rotundata, marginibus conniventibus reflexis, callo brevi junctis

"Diam maj 13, min 10, axis 4 mill" (Benson) Hab. India: S. India (Jerdon), Poona (Blanford, Fan bank)

128 Planispira colletti. Beddome

Helix (Planspura) colletti, Beddome, P Z S 1891, p 314, pl 29, figs 7-9
Chloritis (Trichochloritis) colletti, Pilsbry, Man Conch ser 2, viii, 1893, p 274, pl 51, figs. 36-38, ix, 1894, p 124

Original description:—" Shell openly umbilicate, orbiculatodepressed, rather thin, spire nearly flat; whorls 5, the last obsoletely angulate at the periphery, not descending, very prominently and coarsely striated obliquely; colour light fawn, with a dark band at the periphery; aperture somewhat oblique, lunately suborbicular; peristome simple, very slightly reflexed, margins not joined." (Beddome)

Major diam 19, minor 16, alt. 95 mm. Width of umbilicus

5 mm.

Hab. Burma: Shan States (Bovall).

129. Planispira footer, Stoliczka,

Trachia footei, Stohezka, J. A. S. B. xliì, 1873, p. 170

Helix footei, Hanley & Theobald, Conch. Ind. 1875, pl. 149,
fig. 10

Helix (Planispira) footei, Nevill, Hand List, i, 1878, p. 77

Helix (Plectotropis (Trachia) footei, Tryon, Man. Conch. ser. 2,
iv, 1888, p. 64, pl. 14, fig. 84

Planispira (Trachia) footei, Pilsbry, Man. Conch. ser. 2, ix, 1894,
p. 116.

Original description — "Trachia testa albida, orbiculata, supra deplanata, infra inflata, versus medium angustata, perspective modice umbilicata, undique dense granulifera; anfractibus 4 ad 45, gradatum accrescentibus, primis duobus aut tribus convexiusculis, transversim striatis, cæteris magis deplanatis, transversim costulis inæqualibus et obliquis ornatis, ultimo ad peripheriam valde carinato, costulis in carina evanescentibus, ad aperturam valde descendente atque fere omnino deflexo; basi circa umbilicum rotundate subangulata, similariter costulata, costulis usque ad peripheriam extensis, apertura fere horizontaliter deflexa, margine dilatato fere undique libero, ad an lum umbilica angustissime adnato, circumdata

"Diam. may 133, diam. min. 112, alt totius testæ 6, altitudo apert cum peristomate 5.5, ejusdem latitudo 68 mm" (Stoliczka.)

Hab. India · Belgaum, Bombay Presid (Stokezka)

Allied to P. crassicostata, but with more elevated spire and angulated around the umbilicus

130 Planispira nilagerica, Pfeiffer.

Helix nilagerica, Pfeiffer, P Z S 1845, p 130, ibid, in Philippi, Abb Beschr ii 1846, Heliz, p 87, pl 7, fig 11, Reeve, Conch

Icon vii, 1852, pl 84, fig. 450; Pfeiffer, Conch Cab, Helir, ii, 1853, p 92, pl 82, figs 15-17, Hanley & Theobald, Conch Ind 1870, pl 55, figs 6, 7

Helix (Trachia) milagnica, von Martens, Die Heliceeu, ed 2, 1860,

Helia (Planispii a) nilagirica, Nevill, Hand List, i, 1878, p 77 Helix (Plectotropis (Trachia)) nilagherica, Tryon, Man Couch ser 2, iv, 1888, p 65, pl 14, figs 70, 71 Planispira (Trachia) nilagirica, Pilsbry, Man Couch ser 2, ix,

1894, p 116.

Original description - "T late umbilicata, depressa, discoidea, striata, corneo-albida, linea rufa supra peripheriam cincta; spira planiuscula; anfr. 5 convexiusculi, lente accrescentes, ultimus antice abrupte deflexus, umbilicus latissimus, anfractum penultimum late monstrans, medio angustus, pervius; apertura parva. horizontalis, rotundato-ovalis; perist continuum, album, sublabiatum, reflexum " (Pfeiffer)

Diam mai, 10.75-14 5, min, 8 75-12, alt 3 5-5.5 mill Hab India: Nilgiries (Blanford); Trichinopoly (Blanford)

A distinct and well marked species, the convolute character of the underside of the shell strongly resembling many of the North-American species of Polygyna, such as P cereolus. The supraperipheral band mentioned in the original diagnosis is frequently absent, and many specimens instead have the latter portion of the last whorl dark fulvous, while others again exhibit transverse, alternately light and dark bands, or they may be uniformly pale ochraceous The shell is densely, minutely granulated under the deciduous cuticle, which, when fresh, bears very short, stiff, · densely crowded hairs, neither of which fact is referred to in the diagnosis

131. Planispira nagporensis, Pfeiffer.

Helir nagporensis, Pfeisser, P Z S 1860, 1. 135; Malak ibid, Blatt. vii (1860), 1861, p 235 Helia (Patula (Patulastra)) naypor ensis, Pfeiffor & Clessin, Nomencl Helic Viv 1881, p 90

Original description —" T. latissime umbilicata, depressa, tenuruscula, oblique striata, opaca, carneo-albida; spira medio vix







Fig. 79 —Planispira nagpoi ensis

prominula, anfr. 4 vix convexiusculi, ultimus subtus vix latior, antice deflexus et subtus subconstrictus; apertura perobliqua.

transverse ovalis, perist tenue, marginibus convergentibus, supero recto, basali breviter reflexo

"Diam maj 10, min 8, alt 4 mill" (Pfeiffer.)

Hab India: Nagpore (Jerdon).

This species appears to have escaped all the recorders as, with the exception of Pfeiffer's and Clessin's 'Nomenclator,' the name does not figure in any text-book or faunal list. It is allied to *P. nilagerica*, and may indeed be only a variety of that species. The last whorl, however, is not contracted below behind the peristome, the umbilicus is narrower and does not show as many whorls, while the aperture is nearly horizontal and the margins are not continuous. In colour it is corneous white. A specimen in the Cuming collection measures 13 5 11 4 mm.

The species—hitherto unfigured—is now illustrated from the

type in the British Museum

132. Planispira ruginosa, Ferussac

Helix (Helicella) ruginosa, Férussac, Tabl Syst, Limaçons, 1821, p 43 (nom nud), ibid, Hist Nat. Moll. 1832, pl 71, fig 4,

Expl Pl p m (Live xxvm)

Helia ruginosa, Deshayes in Férussac, Hist. Nat Moll i, 1839, p 38, Reeve, Conch Icon vn, 1852, pl. 125, fig 748, Pfeisfer, Conch-Cab, Helix, jr, 1853, p 60, pl 76, figs 7-10; Hanley & Theobald, Conch Ind 1874, pl 85, figs 2, 3

Helia (Trachia) ruginosa, von Martens, Die Helic ed 2, 1860,

p 160

Helix (Planspira) ruginosa, Nevill, Hand List, 1, 1878, p 77

Helix (Plectotropis (Trachia)) ruginosa, Tryon, Man Couch ser 2,

1v, 1888, p 63, pl. 14, figs 65-66

Planispira (Trachia) ruginosa, Pilsbry, Man Conch ser 2, 1x,

1894, p 116

"H. testa subdiscoidea, supra plana, ad peripheriam subangulata, subtus convexa, late umbilicata, alba, lineis fuscis bicineta; anfractibus longitudinaliter rugoso-plicatis, rugis, plurisque irregularibus; apertura ovato-rotundata, perobliqua; marginibus albis, continuis.

"Diam 11, alt 6 mm." (Deshayes)

Hab India Bengal (Leschenault); Trichmopoly (Blanford), Madura (Beddome)

Alhed to P. asperella, but with more elevated spire and not so

smooth

133. Planispira sordida, Pfeiffei

Helix sordida, Pfeiffer, Symb. Hist Helic ii, 1842, p 39 Planispira (Trachia) sordida, Pilsbry, Man Conch ser 2, ix, 1894, p 116

Original description — T. perforata, globoso-depressa, striis incrementi rugosa, epidermide sordide cornea induta, obtuse carinata, spira depressa, anfr 4½ vix convexiusculis, ultimo subtus

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inflato: umbilico angustissimo, non pervio: apertura lunatorotundata; perist simplice, reflexiusculo.

" Diam 11. alt 7 mill." (Pfeiffer.)

Hab India Pondicherry.

Known only from Pfeiffer's description I have not seen specimens

134. Planispira proxima, Férussac.

Helix (Helicella) proxima, Férussac, Tabl. Syst, Limaçons, 1821, p 48 (nom nud), ibid, Hist Nat Moll 1832, pl 71, fig 5, Expl Pl p in (Livr xxviii)

Expl Pl p in (Livr xxviii)

Hehr proxima, Deshayes in Férussac, Hist Nat Moll 1, 1839, p 29, Pfeiffer, Conch -Cab, Hehx, 11, 1853, p 58, pl 76, figs 4-6; Reeve, Conch Icon vii, 1854, pl 210, fig 1487, Hanley & Theobald, Conch Ind 1870, pl 28, fig 5

Helix (Planispira) proxima, Nevill, Hand List, 1, 1878, p 77

Helix (Trachia) proxima, Pfeiffer & Clessin, Nomencl Helic Viv

1881, p 181.

Helix (Plectotropis (Trachia)) provina, Tryon, Man Conch ser 2, ıv, 1888, p 63, pl. 14, fig 72

Planispira (Trachia) pionima, Pilsbry, Man Conch ser 2, ix, 1894, p 116

Original description: - "H testa orbiculato-depressa, albofucescente, obscure striata, late umbilicata; ultimo anfractu cylindraceo; apertura ovato-rotundata, margine albo, reflexo; peristomate continuo." (Deshaves.)

Anamullay Forest, Nilgiries— Two specimens—labelled forming part of the Cuming collection in the British Museum,

enable me to supplement the foregoing brief diagnosis

Shell moderately umbilicated, depressed-conoid, finely striated, here and there showing traces of minute spirals; whitish, becoming pale fawn-coloured on the last whorl, mouth dark fuscous, unicolorous or variously ornamented with dark or pale brown bands Whorls 5½, convex above, flattened below, increasing rather rapidly, the last dilated towards the mouth. Spire depressed, apex obtuse, suture rather deep. Aperture ellipticovate, margins approaching, united by a thin callus on the parietal wall; peristome somewhat thickened, upper margin broadly expanded, scarcely reflected, with an acute edge, regularly curved, outer margin curved, expanded and slightly reflected, basal margin strongly reflected, straight, columellar margin ascending, broadly triangularly dilated and overhanging the moderate umbilicus, which shows half of the penultimate whorl, when it suddenly becomes contracted

Major diam. 21, minor 17, alt. 12 mm.

Hab. India Coimbatore (Leschenault); Pulney Hills (Fairbank); Trichinopoly (Stoliczka); Anamullay Forest, Nilgiries (Mus. Cuming).

Like several other species of the subgenus Trachia, P proxima exhibits bands variable in size and number. I have not seen any

unicolorous forms, the shells of the Cuming collection in the British Museum showing a broad supra-peripheral band which ascends the spire and is visible above the suture on all the whorls, while below the periphery several narrow bands occur. The shells figured by Tcrussac, Pfeiffer, and in Conch Ind are bandless

135 Planispira? armstrongi, Smith

Helix (Plectoliopis) armstrongi, Smith, Proc Malac Soc London, 1, 1895, p. 219, text-figure

Original description — Testa depresse conica, in medio acute carinata, late umbilicata, solidiuscula albida, zona purpureo-rufa latiuscula, spiram ascendente, supra ornata, spira breviter conica, ad apicem obtusa, anfractus 6-6½, lente et regulariter accrescentes leviter convexiusculi, supra suturam perspicue marginati, costulis confertis obliquis arcuatis et pulcherrime granulatis ornati, ultimus infra carinam subserratam convexiusculus, prope carinam impressus, costulis vel plicis curvatim radiantibus granulatis instructus, antice paulo descendens, circa umbilicum perspectivum rotundatus, apertura angulariter lunata, obliqua, inferne recedens, zona externa supra carina picta; peristoma superne tenue, leviter expansum, obliquum, viv arcuatum, margine inferiore valde arcuato, paulo incrassato, subreflexo, supero callo crasso recto juncto

"Diam maj 28, min 25, alt 14 mm, apertura 7 longa, 11 lata" (Smith)

Hab., Burma (Aimstrong)

"The costulations on the upper surface become stronger as the shell increases, and the granules are also stronger upon the body-whorl than upon the rest of the spire. The acute periphery has a finely scalloped appearance when the shell is viewed from above

or below" (Smith)

The present species stands somewhat isolated in the Indian and Burmese fauna, rather recalling some species of Pleurodonte (section Caracolus), such as P bornii, Pfr, and P. bizonalus, Desh, from the West Indies In form it approaches nearest to Plunispina (Trachia) trochalia, Benson, from the Andaman Islands, but that species has a narrower umbilicus and the margins of the peristome are not united by a raised ridge on the parietal wall, and it also lacks the strongly granulated transverse costæ of P. armstronai.

It is not without hesitation it is placed in *Planispira* in the subgenus *Trachia*, but until specimens with the soft parts are taken, and their examination shall prove the contrary, this appears to be the only course to adopt. Mr. Smith referred the species to *Plectotropis*, but in this view I am unable to concur, as I do not know any species of that group possessing so solid a shell and with such coarse granulated costæ

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136 Planispira trochalia, Benson

Helit trochalia, Benson, A. M. N. H. ser. 3, vii, 1861, p. 82, Hanley & Theobold, Conch. Ind. 1870, pl. 28, fig. 7, Stoliczka, Proc. A. S. B. 1870, p. 87, Pilsbry, Man. Conch. ser. 2, vii, 1801, p. 88, pl. 18, figs. 67, 68

Ampelita (Helit) bigsbyi, Tryon, Amer. Journ. Conch. v, 1869, p. 110, pl. 10, fig. 3

Helit (Planspira) trochalia, Novill, Hand List, i, 1878, p. 77

Planspira (Trachia) trochalia, Pilsbry, Man. Conch. ser. 2, iv, 1804, pp. 115, 116, pl. 34, figs. 1, 5 (jaw. and. radula)

Planspira trochalia, Godwin-Austen, P. Z. S. 1895, p. 442

Original description — "II. testa anguste umbilicata, solidiuscula, orbiculato-conoidea, subtrochiforini, irregulariter ai cuatostriatula, striis nonnullis prominentioribus, castanea, apicem versus albida, spira conoidea, apice valde obtuso, sutura levitor impressa, anfractibus 5, primis convexiusculis, cateris planiusculis, ultimo acute compresso-carinato, antice breviter descendente, subtus convexo, apertura obliqua, elliptico-lunata; peristomate tenui, undique expanso concolori, marginibus subconniventibus, columellari dilatato, umbilicum profundum semitegente." (Benson.)

Diam maj. 17 5-23 5, min 15 5-20 5, alt 12-15 mill.

Hab. Andaman Islands Port Blair (Haughton).

A peculiar form readily recognized by its trochoid spire. No reference is unde in the description to the fact that the last whorl is suddenly contracted behind the peristome, nor to the presence of a hydrophanous cuticle. The shell, moreover, is covered above and below—except at the protoconch, which is smooth and shining—with excessively minute and densely crowded, wavy, spiral lines; the base has in addition a few distant spirals. In colour the species varies from pale fuscous to chestnut. Godwin-Austen mentions a variety, conico-clata—one of Nevill's MS names—but gives no definition

137 Planispira vittata, Muller.

Helix vittata, Muller, Verm terr flux 11, 1774, p. 76, Wood, Index Test 1825, pl 34, fig 93, Orbigny, Diet Hist Nat Atlas, 111, 1849, pl 19, figs. 3, 4. Deshayes in Férussac, Hist Nat Moll 1, 1850, p 233, Chenu, Illustr Conchyl, Helix, 1851, pl. 10, figs 6, 7, Reeve, Conch Icon vii, 1852, pl. 78, fig 412, Pfeisfer, Conch Cab, Helix, 1, 1853, p 329, pl 53, figs 15, 16, 18, 19, Hanley & Theobald, Conch Ind 1875 pl 130, fig 10, Kobelt, Illustr Conch Bu h, 11, 1879, pl 73, fig 21

Helix (Helicogena) vittata, Férussac, Hist Nat Moll 1822, pl. 25 A, fig 9, pl 26, figs 4-6

Helix spinolæ, Villa, Disp Syst Conch 1841, p 55

Helix conula, Wood, Index Test Suppl 1828, pl 7, fig 8

Helix (Planspia) vittata, Nevill, Hand List, 1, 1878, p 76

Helix (Eurystoma) vittata, Albers, Die Helic 1850, p 126, Tryon, Struct Conch 111, 1884, p 40, pl 95, fig 58, Tryon, Man Conch ser 2, 1v, 1888, p 120, pl 33, figs 59, 60, 62, Godwin-

Austen. Proc Malac Soc London, vi, 1904, p 48, pl 4 (anatomy)

Planispira (Trachia) mitata, Pilsbry, Man Conch ser 2, 1x, 1894. p 115 (anatomy), p 116, pl 19, ing 24 (shell)

Eurystoma mitata, Jousseaume, Mém Soc Zool France, vn, 1894,

Shell perforate, depressed-conoid, solid, whitish or yellowish corneous, usually ornamented with various narrow and broad vellow or brown bands, from 1 to 10 in number, nepionic whorls smooth, shining, pale fuscous or blackish brown, the remaining whorls finely and irregularly striated, minutely granulated and occasionally slightly wrinkled in places. Spire convex, suture impressed, apex obtuse Whoils 42-5, subplanulate or convex above, tumid below, increasing slowly and regularly, the last suddenly dilated towards the mouth and deeply descending in Aperture oboyate, oblique, usually black or dark brown. occasionally pale fuscous; margins convergent, united by a sinuous callus on the parietal wall; peristome a little thickened, rather widely expanded and reflexed, usually of the same colour as the mouth, but sometimes edged with a paler colour, and occasionally whitish or jellowish, upper and outer margin regularly curved, basal margin nearly straight, columellar margin strongly dilated and reflexed, overhanging the umbilious

Major diam 22-28, minor 17 5-21.5, alt 15-19 mm

Hab India · Tranquebar, Coromandel (Morch), Trichinopoly (Blanford), Malabar, Travancore Ceylon (Stoliczka, Nevill)

A somewhat variable shell, especially as regards banding single specimen in the Indian Museum labelled "Java" is recorded by Nevill, but this record must be based either on a wrongly identified shell or, which is far more likely, on an accidental mixing of labels

Var albina, Grateloup.

Helm vittata, var albina, Grateloup, Act Soc. Linn Boideaux, xi, 1840, p 401, pl 1, fig 19

Helm vittata, var, Pfeisser, Conch-Cab, Helm, 1, 1853, p 330, pl 58, fig 17

Helia (Eurystoma) vittata, var spinolæ (non Villa), Tryon, Man

Conch ser 2, 1v, 1888, p 120, pl 33, fig 61

Planispii a (Trachia) vittata, var spinolæ, Pilsbry, Man Conch ser 2, ix, 1894, pl 19, fig 23

Differs from the typical form in being smaller, without bands. and in the aperture being less dilated transversely.

Major diam 22, minor 16, alt 15 mm

The shell figured by Tryon (copied from Conch -Cab), and the one by Pilsbry as spinole, do not agree with the description of Hehx spinola by Villa, which differs simply from the type by its smaller size and less numerous bands

138. Planispira shanica, Beddome.

Helw shanca, Beddome, P. Z. S. 1891, p. 314, pl. 29, figs. 10-12 Chloritis (Truchochloritis) shanca, Pilsbry, Man Conch. ser. 2, vm, 1893, p. 275, pl. 51, figs. 39-41, 1x, 1894, p. 124

Original description — "Shell narrowly umbilicate, depressedly turbinate, rather solid; whorls 5, gradually increasing, rather convex, the last subangulate at the periphery, slightly descending towards the mouth, all furnished with a fine oblique striation, more prominent on the last whorl; colour a light fawn, darker at the apex of the shell and near the mouth, a narrow dark band just above the periphery; aperture oblique, rotundately lunar, peristome slightly reflexed, dark fawn-coloured, the margins distinct." (Beddome)

Major diam. 14, minor 13, alt 9.5 mm Hab. Burma Shan States (Boxall)

A close examination of the type, in the British Museum, has convinced me that this species is a *Trachia*, not a *Chloritis*. There is no sign of any hair-scars. In the original description the shell is said to be finely striated, the striæ being more prominent on the last whorl. I find, however, that the last whorl is distinctly plicate-striate, almost ribbed, approaching *P. crassicostata* in this respect.

139. Planispira fritillata, Benson.

Helix fritilata, Benson, A M N H sei 3, xi, 1863, p 320, Hanley & Theobald, Conch Ind 1874, pl, 86, figs 8-10 Helix (Patula (Punctum)) fritillata, Tryon, Man Conch ser. 2, in, 1887, p 33, pl. 22, figs 17-19

Original description — "H. testa perspective umbilicata, depresso-subconoidea, arcuatim costulato-striata, subtus læviore polita, superne strus confertis spiralibus impressis decussata, interstitus conspicue quadrato-granulatis, pallide cornea; spira convexa, subconoidea, apice obtuso, lævigato, sutura profunda; anfractibus 6, angustis, lente accrescentibus, convexis, ultimo demum latiusculo, extus depresso, antice vix descendente, subtus valde convexo, circa umbilicum excavato, apertura obliqua, oblique semiovato-lunata, peristomate superne tenui, valde arcuato, subtus breviter expansiusculo, arcuato, extus marginato, marginibus remotioribus

"Diam. maj 13, min. 12, axis 7 mill." (Benson)
Hab Burma Pegu

Genus CHLORITIS, Beck.

Chloritis, Beck, Index Moll 1838, p. 29, Gray, P.Z S 1847, p 172, Albers, Die Helie 1850, p 91, von Martens, ibid ed 2, 1860, p 161, Mollendorff, P Z S 1891, p 335, Pilsbry, Man Conch ser 2, vi, 1891, p 242; viii, 1893, p 270, ix, 1894, p. 117, pl 28, figs. 1, 2 (anatom), C pon teri)

CHLORITIS 167

Erigone, Albers, Die Helic. 1850, p 92, Adams, Gen Rec Molin, 1855, p 202
Semicornu (Klein). Adams. Gen Rec Moll. 11, 1855, p 202

"Shell varying from discoidal and biconcave to depressed subglobose with convex spire; the apical whorl flattened or sunken, and showing under a lens regularly arranged granules or hair-points, which often persist over the whole shell Aperture lunate, the lip reflexed

"Animal with undivided sole, the edges of the foot lacking a foot border; sides irregularly granulated; tail rounded, above with an impressed longitudinal median line; back from mantle to head having a few longitudinal grooves Mantle edge bearing a

small right body-lappet

"Jaw strong and ribbed Radula having the middle cusp only developed on central and inner lateral teeth, the cutting points about as long as the basal plates, side cusps completely absent, but represented by small cutting points." Lateral teeth with

a long, oblique, bifid mesocone and a small ectocone

"Genital system characterised by the lack of dart-sack or other accessory organs on the female side, the spermatheca duct rather long and closely bound to the uterus. Penis without appendix, its cavity containing at the apex an imperforate fleshy papilla, situated beside the opening of the epiphalius, epiphallus long, the penis retractor inserted upon it; terminating in a flagellum and vas deterens" (Pilsbry.)

140. Chloritis bifoveata, Benson.

Helix biforeata, Benson, A. M. N. H. ser. 2, xviii, 1856, p. 251; Hanley & Theobald, Conch. Ind. 1870, pl. 14, fig. 8.

Helix (Chloritis) biforeata, Pilsbry, Man. Conch. ser. 2, vi, 1891, p. 245, pl. 50, fig. between 36 and 42.

Chloritis (Trichochloritis) biforeata, Pilsbry, op. cit. ix, 1894, p. 124.

Original description :—"T umbilicata, subglobosa, utrinque concava, oblique striata et minutissime granulata, luteo-fusca, translucens; spira profunde excavata, perspective umbiliciformis, anfr 4½ angusti, convexi, recedentes, ultimus prominens, inflatus, superne compressus, cæteros occultans, subtus circa umbilicum mediocrem perspectivum compresse angulatus; apertura verticalis, longissima, utrinque testam superans, angustissime lunata, superne et inferne subangulata, perist simplex, acutum, expansiusculum, marginibus remotis convergentibus, columellari brevi, subverticali, leviter expanso

"Diam. maj 10, min 9, alt. 6 mili; long apert 7, lat vix 2 mill" (Benson)

Hab Burma · Therabum, Tenasserim Valley (Theobald)

A peculiar form, readily recognized by the sunken spire, in which feature it approximates such species as C. ungulina, from Ceram, and C unguiculina, from Buru, while the umbilicus much resembles that of C. biconcava from China

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Section Trichochloritis. Pilsbru.

Trichochloritis, Pilsbry, Man Conch sei 2, vi, 1891, p 267, ix, 1894, p 123, Wiegmann in Weber, Zool Forsch Reise Niederl Ost-Indien, 111, 1893, p 189, pl 13, fig 10 (anatomy, C crassula)

"Shell depressed, rather thin, the spire low-convex or flat, the base generally obtusely angled around the umbilicus not deciduous, apex and the whole shell hirsute or marked by hair-scars airanged in regular lines, lip thin, expanded or narrowly reflexed"

Type. Heliv breviseta. Pfr.

Range Southern China to Borneo

Prof Pilsbry states (? c) that the anatomy is unknown, although in the next paragraph he refers to the genital system of C. crassula having been figured by Wiegmann, and he proceeds to compare this with that of C. porter which, he says, it resembles "except that the enlargement at the apex of the penis is long and curved—so long that Wiegmann calls it a penis gland, although in my opinion it is not glandular, but supply a pouchlike enlargement of the penis for the accommodation of a large

imperforate papilla"

"The epiphallus bears the retractor, and is He continues continued beyond the insertion of the vas deferens in a short flagellum The duct of the spermatheca is much and abruptly swollen at the base and the swelling is doubtfully interpreted as a dart-sack and mucus gland by Wiegmann, who did not open it, however If his view is correct, the species must be an Eulotella, but I prefer to consider the structure as a mere muscular enlargement of the spermatheca-duct, probably with plicate internal walls, such as is often found in the Helices union of dart-sack with spermatheca-duct would be an extremely unusual character, if confirmed"

Pilsbry, while admitting that the sections of Chloritis appear to intergrade by rather easy stages throughout, retains the name Truchochloritis for the group of small, thin species having the same distribution as Camæna, and of the Indian species he includes in it hemiopta, propinqua, shanica, colletti*, and bifoveata, while delibrata, gabata, and helfers, which Mollendorff on conchological grounds included in Chloritis, he refers to Trachia. The generative organs of delibiata, as figured by Pilsbry, show scarcely any difference from those of Chloritis, except that in the latter the cavity of the penis contains an imperforate fleshy papilla at the apex. Under these circumstances I prefer to follow Mollendoiff in

his classification

^{*} shanca and collette, the types of which I have examined, certainly have no immediate affinity with Chloritis, being undoubtedly Trachias

141. Chloritis propingua, Pfeiffer.

Helix propingua, Pfeisfer, P Z S 1857, p 109, ibid. Novit. Conch ser 1, 11, 1869, p 498, pl 107, figs 15-17, Hanley & Theobald, Conch Ind 1870, pl 30, fig 10

Helia unicineta (Bens MS), Theobald, J A S B xxxiii, 1864, p 242 (nom nud), Blanford, op cit. xxxiv, 1865, p 104

Helia (Plectotropis (Trachia)) propinqua, Tryon, Man Conch ser 2, iv, 1888, p 63, pl 14, figs 55-57

Chloritis (Trichochloritis) propinqua, Pilsbry, Man' Conch ser 2.

ıx, 1894, p 124.

Helia (Planispira) propingua, Nevill, Hand List, i, 1878, p 79, Godwin-Austen, J A S B lxiv, 1895, p 156, pl 7, fig 4

Helia (Trichochloritis) propingua, Peile, Journ Bombay Nat Hist.

Soc x1, 1897, p 134, Blanford, op cit x11, 1899, p 326

Original description -"T umbilicata, globoso-depressa, tenuis, striatula, albida aut pallide fuscula, fascia 1 angusta castanea supra medium ornata; spira brevissime conoidea; anfr 4-5 convexiusculi, ultimus rotundatus, antice deflexus; umbilicus angustus, pervius, apertura diagonalis, lunato-subcircularis; perist album, sublabiatum, marginibus convergentibus, undique late expansis ' (Pfeiffei)

Diam maj 14-19, min 11 5-151, alt 71-93 mm

Shell moderately umbilicated, depressed-conoid, shining under a deciduous cuticle, white, with a reddish-brown, supra-peripheral band Whorls 44, increasing slowly, finely structed, flattened above, convex below, subangulated around the umbilicus, the last widening rather suddenly towards the mouth, slightly constricted above behind the peristome, shortly descending in front, protoconch microscopically granulated, the later whorls deusely crowded with minute hair-scars arranged in quincunx and usually disappearing in weathered specimens on the last whorl, which is slightly and sparsely spirally wrinkled in places below. Aperture oblique, oboyate, margins approaching, united by a thin callus on the parietal wall; peristome white, thickened and reflexed; upper, outer, and basal margins regularly curved, columellar margin ascending, triangularly dilated and slightly overhanging the deep umbilious, which at first is moderately wide, showing half of the penultimate whork when it becomes suddenly contracted.

The above description is drawn up from a specimen, from

Poona, in my collection

Major diam 19, minor 15, alt 11 mm."

Hab India Bombay, Satara (Peile), Broach, Khandala, Poora Mahableshwar (Blanford); Belgoan (Foote), Ganjam (Beddome),

Pulney Hill (Theobald)

The Theobald collection in the British Museum contains four specimens from Pulney Hill and labelled H. fallaciosa, which without hesitation I refer to C propingua. These measure. major diam 145-165, minor 1175-135, alt 85-95 mm exhibit the hair-scars over the whole surface of the shell, but another specimen from Poona, in the same collection, shows the 170 HELICIDÆ

hair-scars only in places, the last whorl being totally devoid of This appears to be the case when the shell is considerably worn and has completely lost the periostracum I have seen unbanded specimens in Major Peile's collection

142 Chloritis helferi. Benson

Helix helfers, Benson, A M N H ser 3, vi, 1860, p. 191, Hauley & Theobald, Conch Ind 1870, pl 29, figs 8, 9

Helir (Trachia) helfers, Pfeiffer & Clessin, Nomencl Helic Viv

1881, p 181

Helia (Plectotropis (Trachia)) helferi, Tryon, Man Conch ser 2, 1v, 1888, p 63, pl 14, figs 59, 60

Lefferi, Pulsbry Man Conch ser 2, 1v, 1894.

Planispira (Trachia) helferi, Pilsbry, Man. Conch ser 2, ix, 1894, p 116

Planismra helfer i, Godwin-Austen, P Z S 1895, pp 442, 449

Original description - "Testa profunde et anguste perspective umbilicata, orbiculata, subdepressa, oblique striatula, foveolis conspersa, sub epidermide rufescente, sparsim hispida, albida, fascia rufa angusta superne ornata, spira depresse conoidea, apice valde obtuso, sutura impressa, submarginata, anfractibus 41 convexiusculis, angustis, lente accrescentibus, ultimo antice descendente, supra per ipheriam obsolete angulato, circa iimbilicum subito excavatum compressiusculo, apertura obliqua, transverse ovato-lunata, peristomate undique expanso, marginibus approximatis, callo tenui junctis

"Diam major 12, minor 10, axis 6 mill"

Hab Andaman Islands

This species was stated by Benson to be nearly related to asperella and fallaciosa, but in build and texture it certainly approximates much more to C gabata Two specimens in my collection, one of which is efasciate, have the periostracum in a well preserved condition, and show the rather sparsely distributed hans detected by Benson, "on the portion of the caducous epidermis remaining in the single specimen received for examination" Lt-Col. Godwin-Austen records (l c) the finding in de Roepstorff's collection from the Nicobars of a young shell of this species, but he considers this habitat requires confirmation, as it might have got among them accidentally.

143. Chloritis leithi. Gude

Chloritis (Trichochloritis) leithi, Gude, Proc Malac Soc London, 21, 1914, p 53, text-figure

Original description - "Shell rather widely umbilicated, depressed-conoid, thin, transparent, corneous, with a narrow chestnut supra-peripheral band, finely plicate-striate, somewhat sparsely covered with soft hairs placed in pits and arranged in quincumx Spire low, apex sunken, suture deep Whorls 4, convex above, tumid below, increasing rapidly, the last exceeding in width the total of the other three, dilated at the mouth, not constructed behind the peristome, shortly but deeply descending in front, subangulated around the umbilicus, which is rather wide at first, showing the greater part of the penultimate whorl, when it suddenly contracts, leaving only a very narrow perforation Aperture subcircular, margins approaching, peristome scarcely thickened, expanded but not reflexed; the columellar margin triangularly dilated and slightly overhanging the umbilicus.

Major diam 145, minor 115, alt 7 mm" (Gude)

Hab India. Bombay (Leith)

From C. helfers, an Andaman species, C. leithe differs in being much thinner in texture, in having the hairs, which are larger and softer, much more crowded, and in being coiled differently



Fig 80 -Chloritic leiths (From Proc Malac Soc London)

as it has the last whorl proportionately wider. It also bears some superficial resemblance to Chloritis propinqua, but that species is a much stouter shell, with a more elevated spire, while in C leithi the umbilicus, although wider at first, becomemore contracted. There are two other shells in the British Museum also collected by Dr. Leith, but they are slightly damaged. A specimen in Mr. Ponsonby's collection is a trifle smaller than the type, measuring 14 10 75.675 mm

None of the specimens is quite adult, the peristome apparently

not having been quite completed

144 Chloritis wimberleys, Godwin-Austen

Planispra wimberleyi, Godwin-Austen, P Z S 1895, p 449

Original description—"Shell depressedly orbiculate, narrowly umbilicated, very finely hirsute; sculpture, when this is abrailed the surface is covered with minute regular papillation, which is much coarser than that of *H helfer*, colour horny-grey; spire rounded; apex rounded, suture impressed, whorls 4, not fully developed, slightly convex, aperture and peristome probably slightly expanded and reflected

"Maj diam. 10.2, min. 89, alt axis 57 mm.

" Hab. Nicobars

"The species is nearest to H. helfer, but may be distinguished by its narrower umbilicus and the great difference in sculpture, and the whorls above are not so flat. This is probably No 102 of Nevill's Hand List (p 76), collected by Ferd Stoliczka" (Godwin-Austen)

145. Chloritis delibrata, Benson.

Helix delibiatus, Benson, J. A. S. B. v., 1836, p. 352

Helix delibrata, Benson, A. M. N. H. ser. 2, n., 1848, p. 162,

Blanford, J. A. S. B. xxxxv, 1865, p. 89, Hanley & Theobald,

Conch. Ind. 1870, pl. 14, fig. 10, Nevill in Anderson, Zool.

Results Exp. W. Yunnan, 1, 1878, p. 873

Trachia delibrata, Stoliczka, J. A S B vl. 1871, p. 225, pl 16.

figs 1-3 (anatomy)

Helir (Planispina) delibrata, Nevill, Hand List, 1878, p 76

Helir (Trachia) delibrata, Tapparono Canefri, Ann Mus Civ.

Genova, ser 2, vii, 1889, p. 325

Helii (Plectotropis (Trachia)) delibrata, Trvon, Man Conch ser. 2, iv, 1888, p. 64, pl. 14, fig. 75

Planispira (Trachia) delibrata, Pilsbry, Man Conch ser. 2, ix,

1894, p 116, pl 32, figs 41, 45 (anatomy)

Chloritis (Trichochloritis) delibrata, Gude, Proc Maine Soc. London, vn, 1906, p 115

Shell discoid, rather widely umbilicated, thin, semi-transparent, pale fuscous or ochraceous, finely strinted, shining under a velvety cuticle, covered in the fresh condition with close-set stiff bristles arranged in quincunx. Spire plane, apex depressed or immersed, Whorls 3\-4, convex, subangulated around the umbilious, increasing rather suddenly, the last twice as wide as the penultimate, slightly dilated towards the mouth, slightly gibbous below behind the peristome, shortly and abruptly descending in front Aperture oblique, obovate-auriculate, margins approaching, peristome white or pale fulvous, scarcely thickened, reflexed, upper margin ascending at first, curved; outer and basal regularly curved, columellar obliquely ascending, triangularly dilated and overlanging the umbilious, which shows half of the penultimate whork, when it suddenly contracts

Major diam 17-22, minor 14-17, alt. 8-10 5 mm

Sylhet, Assam (Stoliczka, Peal): Darjeeling India (Stoliczka, Mainwaring); Khasi Hills and Dafia Hills (Godwin-Bhamo (Anderson); Thagata Juva, Mouleyst Burma Austen). Mt (Fea)

Apparently a common shell, having been collected by several The original diagnosis by Benson is very short and might apply to several allied forms—a very unusual occurrence with Benson's species The above description is drawn up from a number of specimens collected for the writer by a native in the Khası Hılls

The following varieties are admitted —

Var procumbens, Gould

p 453, pl 24, fig 1, Philippi, Abb Beschi Conchyl in, 1847, Hehr, p 3, pl, 10, fig 5, Reeve, Conch Icon vii, 1852, pl 82, fig 435 Helia procumbens, Gould, Boston Journ Nat Hist. 11, 1844,

Helix delibrata, Pfeiffer, Conch - Cab., Helit, 11, 1854, p 352, pl 135, figs 8, 9

Helia delibrata, var procumbens, Nevill, Hand List, 1, 1878, p 76 Differs from the type in having the last whorl more dilated towards the mouth and more deeply descending in front, the spire is more raised and the umbilious narrower

Hab. Burma Tavoy and Moulmann (Stoliczka); Bassein and

Arakan Hills (Blanford, Kurz)

Var fasciata. Godwin-Austen

Helix delibrata, var fasciata, Godwin-Austen, J A S B xliv,

1875, p 1, pl 1, fig 1

Helix (Plectoti opis (Trachia)) delibrata, var fasciata, Tryon, Man
Conch ser 2, iv, 1888, p 64, pl 14, fig 76

Variously ornamented with brown bands The commonest form appears to be one with a single supra-peripheral band

Hab India W Khasi Hills (Godwin-Austen); Sibsagar (Peal)

'Var. khasiensis. Nevill

Helix delibrata, Hanley & Theobald, Conch. Ind 1870, pl 14.

Helix (Trachia) delibrata, var Lhasiensis, Nevill, J A S B xlvi, 1877, p 21

Characterized by the raised and rounded whorls, less open umbilicus and contracted aperture

Hab India Khasi Hills, Naga Hills

146. Chloritis gabata, Gould

Helix (Caracolla) gabata, Gould, Boston Journ Nat Hist 1v, 1844, p 454, pl 24, fig 9

Helix gabata, Reeve, Conch Icon vii, 1852, pl 127, fig 766, Hanley & Theobald, Conch Ind 1870, pl 14, fig 4, Pfeiffer, Conch Cab, Helix, iii, 1881, p 482, pl 159, figs 15-17.

Plectotropis gabata, Wallace, P Z S 1865, p 408

Trachia gabata, Stohezka, J A. S B. xl, 1871, p 228

Helix (Planispira) gabata, Nevill, Hand List, 1, 1878, p 70

Helix (Phildora) gabata, von Martens, Journ Iann Soc London, xxi, 1887, p 162

Helix (Plectotroms) gabata. Tryon, Man Conch ser 2 vg 1888

Helix (Plectotrops) gabata, Tryon, Man Conch ser 2, 1v, 1888, p. 57, pl 14, fig 82

Helia (Frachia) gabata, Tapparone Canefri, Ann. Mus Civ Genova, ser 2, vii, 1889, p 325 Planispira (Trachia) qabata, Pilsbry, Man Conch ser 2, ix, 1894,

Chloritis (Trichochloritis) gabata, Gude, Proc Malac Soc'London, vn, 1906, p 115

Original description —" Testa albido-cornea, supra planulata, mfra valde convexa, late et profunde umbilicata, anfr 41, leviter striatis, ultimo carina castanea circumdato, apertura subquadrata, labro albo reflexo

"Shell pale horn-color, shining, showing about four and a half whorls above, which compose a nearly discoidal spire, suture distinct; the last whorl somewhat channelled near the periphery, which consists of a prominent, obtuse, compressed, chestnut-coloured carina, fully developed to the lip, beneath, greatly convex, descending suddenly into a broad, deep, tunnel-shaped umbilious, passing nearly through the shell; surface faintly marked by the still of growth, aperture rendered somewhat quadrangular by the junction of the lips, and the two angles at the keel, and the ridge at the umbilicus, lip white, reflected, commencing below the keel, then rising to a level with it

Diam 4 mch [=20.25 mm], height less than 2 inch
[=10 mm]" (Gould)

Hab Burma Tavoy (Gould), Moulmann (Stoliczka, Fea), var India. Khasi Hills (Stoliczka); Cachar (Godwin-Austen)

A well-marked species, characterized by the flattened spire and

carnated whorls

Wallace mentions the species from Menado, Celebes (P Z.S. 1865, p 408) but this record was based on a mistaken identification The Celebes form has since been made the type of another species—pilispaisa—by von Martens (Sitz-Ber. Ges Naturf Fr. Berlin, 1885, p 192)

Var merguiensis, Philippi.

Heli's mergurensis, Philippi, Zeits Malak in, 1846, p 192; Reeve, Conch Icon vi, 1854, pl 177, fig 1205, Hanley & Theobald, Conch Ind. 1870, pl 14, fig 7

Helir (Plectotropis) qubata (=merguiensis), Tryon, Man Conch sei 2, iv, 1888, p 57, pl 14, fig 83

Planispira (Trachia) qabuta, yai merguiensis, Pilsbry, Man Conch. ser 2, 12, 1894, p 116.

Hab Burma Mergui (Philipm): Mergui Archipelago, King

Island (Anderson)

Differs from typical gabata in having the spire raised, the supra-peripheral keel less acute and more compressed, the umbilicus narrower, and the margins of the peristome more reflexed

147 Chloritis hemiopta, Benson

Helia hemiopta, Benson, A. M. N. II sei. 3, xi, 1863, p. 318, Hanley & Theobald, Conch. Ind. 1870, pl. 30, fig. 4, pl. 53, fig. 8, Pfeitier, Novit Conch. v, 1877, p. 37, pl. 143, figs. 1-8, Dohrn, Conch. -Cab., Helia, iv, 1894, p. 578, pl. 170, figs. 5-7

Helia (Planspira) hemiopta, Nevill, Hand List, 1, 1878, p. 78

Helia (Obba (Necesski)) hemiopta, Polsky, Man. Conch. ser. 2, vi.

Heli (Obba (Neocepolis)) hemiopta, Pilsbry, Man Conch ser 2, vi, 1891, p 238, pl 31, figs 21, 25, pl 64, figs 67-72 Chloritis (Trichochloritis) hemiopta, Pilsbry, Man Conch ser 2, ix,

1894, p 124.

Planispira hemiopta, Godwin-Austen, P Z S 1895, p 442

Original description -"II testa anguste umbilicata, depressoconoidea, vix striatula, læviuscula, minutissime granulata, opaca, albida, anfractu ultimo superne castanea, versus peripheriam suturiatore; spira convexo-conoidea, apice obtuso, sutura vix impressa; anfractibus $4\frac{1}{2}$, convexiusculis, sensim acrescentibus, ultimo superne prope peripheriam obtuse angulatam concaviusculo, subtus convexiusculo, apertura obliqua, subquadratolunata, intus concolore, peristomate expansiusculo, superne antice arcuato, subtus breviter reflexo, marginibus remotis, columellari superne valde dilatato, umbilicum subtegente

"Diam maj. 16, min. 132, axis 10 mm." (Benson)

Hab Andaman Islands Port Blair (Stoliczka, Nevill, Wood-

Mason, Roepstorff)

A rather striking species of Trichoculoritis, exhibiting a considerable amount of variation as regards ornamentation and coloration. Pfeiffer figures several distinct forms. Lt-Col Godwin-Austen mentions two varieties (unifasciata and albina, both MS. names of Nevill) The commonest form appears to be the one with a dark chestnut or blackish-brown peripheral band. The colour of the shell is usually white, but some forms have the penultimate and last whorls reddish brown or dark fuscous above the periphery, with or without the peripheral band, or the two whorls may be entirely fuscous. White shells without band also occur. The last whorl, moreover, is characterized by a girdle-like swelling at the periphery bounded above by a corresponding depression, while the upper part of the whorl again is inflated. The peristome is usually white, but when the last whorl is entirely dark brown it is reddish violet.

148 Chloritis cyclotrema, Benson

Helia cyclotrema, Benson, A. M N H ser 3, xi, 1863, p 88, Hanley & Theobald, Conch Ind 1870, pl 28, fig 10.

Arrophanta cycloticma, Theobald, Cat Shells Brit India, 1876,

Nanna (Artophanta) cyclotrema, Tryon, Man Conch ser 2, 11, 1886, p 17, pl 2, fig 22

Helix (Planispira or Trachia) cyclotrema, Blanford, Proc Malac Soc. London, 111, 1899, p 283

Original description.—"H testa sinistrorsa, obtecte umbilicata, conoideo-subglobosa, oblique striatula, granulata, sub epidermide cornea, albida; spira conoidea, apice obtuso, subfoveata, suturis impressis; anfractibus 4½, convexis, gradatim crescentibus, ultimo ad peripheriam obtuse angulato, unifasciato, antice lato, longe descendente, subtus convexo; apertura valde obliqua, rotundata, peristomate dilatato, reflexiusculo, marginibus conniventibus, approximatis, callo brevi junctis, columellari late auriculato umbilicum celante

"Diam maj 22, min. 18, axis 11 mm" (Benson)
Hab. India: Sumeysur, base of Himalayas (Theobald).

149 Chloritis anserina, Theobald.

Helu anserna, Theobald, J. A. S. B. xxxiv, 1866, p. 276 (nom nud.), ibid xxxix, 1870, p. 395 (nom nud.)

Helix anserina, Hanley & Theobald, Conch. Ind. 1875, pl. 112, figs 7 & 10

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Shell narrowly umbilicated, depressed-globose, pale corneous, finely striated transversely, densely covered with hair-scars arranged in quincunx, spire depressed, apex obtuse, suture linear. Whorls 5, convex, increasing rather rapidly, the last much dilated towards the mouth and slightly constricted behind the peristome, the base inflated towards the mouth, not angulated at the periphery or around the umbilicus. Aperture broadly auriculate, margins slightly approaching, united by a thin flexuous callus on the parietal wall; peristome white, thickened, and reflexed, upper margin nearly straight, outer and basal curved, columellar vertical, broadly triangularly dilated and reflexed over the narrow umbilicus.

Major diam. 30, minoi 25, alt. 185 mm.; apert width 13, height 14 mm.

Hab Burma Shan States (Fedden)

The species, although well illustrated in Conch Ind, has never been described. The above description is drawn up from the shell—probably the type—in the Theobald collection in the British Museum. I have adopted the later spelling of the specific name, the earlier one in the J. A. S. B., in both cases, being evidently due to a printer's error.

This and the next species bear a striking resemblance to

C. franciscanorum, Gredler, a Chinese form

150. Chloritis theobaldi, Gude

Chloritis (Trichochloritis) theohaldi, Gude, Proc Malac Soc London, xi, 1914, p 54, text-figure.

Original description — Shell moderately umbilicated, depressed-conoid, pale corneous, with a very faint supra-peripheral band, finely striated transversely, and densely covered with hair-scars arranged in quincum. Spire conoid, apex prominent, suture rather deep. Whorls 5½, convex, increasing slowly and regularly, the last widening towards he mouth, not constricted behind the peristome, slightly angulated at the periphery at first, the angulation disappearing near the mouth; angulated around the deep umbilicus, which shows nearly the whole of the penultimate whorl Aperture subcircular, margins distant, united by a thin sinuous callus on the parietal wall, peristome white, thickened and shortly reflexed, margins regularly curved, columellar ascending, triangularly dilated, and slightly overhanging the umbilicus.

"Major-diam 245, minor 21, alt 16 mm, apert width 10,

height 95 mm" (Gude)

Hab. Burma · Shan States (type), Bhamo

The shell on which this species is based occurred with the specimen of *C anserina* in the Theobald collection. It differs from the latter in having a more conical spire and a wider umbilicus, the base is less inflated, and in consequence the aperture is more dilated laterally. It is also differently coiled, for, although it measures one-fifth less in its diameter, it possesses

half a whorl more, the hair-cars, moreover, are much finer and more crowded, while the presence of a supra-peripheral band, although only a faint one, still further differentiates it from C anterina.





Fig 81 -Chloritis theobalds (From Proc Malac. Soc. London)

A specimen in the Hungerford collection of the British Museum I also refer to C. theobaldi. It is a trifle smaller than the type, measuring 21.20.15 mm, and exhibits a very faint trace only of

the supra-peripheral band near the peristome.

The two species approach C. franciscanorum, Gredler, a Chinese form. C. theobaldi especially bears a striking resemblance, but has the umbilicus a little more contracted, the spire is relatively higher, and the aperture is less dilated laterally, while the columellar margin ascends less obliquely, the hair-scars are also finer.

Genus AMPHIDROMUS, Albers.

Amphidromus, Albers, Die Heliceen, 1850, p. 138 (in part), Pfoisser, Malak Blätt in, 1856, p. 146 (in part), von Martens, Die Heliceen, ed. 2, 1860, p. 184; ibid, Preuss Exp. Ost-Asien, Zool Theil, ii, 1867, pp. 77 & 332, Semper, Reisen, Arch. Philipp. 2to Theil, vol. iii, 1877, p. 146, Fulton, A.M. N. H. ser. 6, xvii, 1896, p. 66, Pilsbry, Man. Conch. ser. 2, xiii, 1900, p. 127.

TYPE, Helix perversa, Lann.

Range India (Sylbet), Burma, Farther India, Malay Archipelago.

and Philippine Islands.

"Shell of moderate size, dextral or sinistral, long-ovate, with 6-8 moderately convex whorls; smooth (rarely ribbed) and light or bright-colored, yellow predominating, often with green or brown streaks, flames, or bands. Apical whorls smooth or obsoletely pitted. Aperture somewhat oblique, ovate, not contracted by teeth or folds; peristome more or less thickened, expanded, or reflexed, the columellar margin reflexed, with a very weak fold or none.

"Jaw thin and weak, with flat ribs crenulating the edges. Radula with broad V-shaped rows, the teeth of 'arboreal' type, with the side cusps brought near the median cusp, all the cusps broad; outwardly the side cusps are split Kidney extremely long and narrow, with reflexed ureter and closed secondary ureter Genitalia of typically epiphallogonous structure; receptaculum

seminis on a long, simple duct; penis short, with the retractor muscle inserted low, and ending in a flagellum and the vas Nervous and retractor systems Helicine" (Pilsbry.)

The genus Amphidromus as originally proposed by Albers included several species since then referred to Helicostula. Von Martens was the first correctly to define the group, which owes its name "to the peculiar circumstance that several species occur either dextral or sinistral, with equal frequency, others are sinistral only, still others dextral" Many of the species were originally described as Bulim, while the group remained to be considered as a section of the genus Bulimus, until Pilsbry in 1900 proved that the genus did not belong to "the Bulimulidae, but to that group of Helicidæ called Epiphullogona, of which the genera Chloritis, Obba, Planispira, and Papuina are leading members."

The Indian region contains but a limited number of species, which is not surprising when we bear in mind the fact that it is on

the confines of the area of distribution of the genus

Bulimus and amanensis (coll Mousson) has been referred to by von Martens in Preuss Exp Ost-Asien, 1867, p 339, as from the Andaman Islands; it was described and figured by Pfeiffer in Novit Conch ser 1, iv, 1871, p 35, pl 116, figs 7-10, and referred to Amphidiomus inversus as a small form by Pilsbry (Man. Conch. ser 2, xm, 1900, p 169, pl 56, figs 94-97) Pfeiffer himself stated that it approached B inversus, and might perhaps be regarded as a dwarf variety Fulton states (A M N. H ser. 6, xvn, 1896, p 70) that the small form of A inversus has been found at Sarawak and Sirhassen Island by Everett, and as no Amphidromus has been found in the Andaman Islands by recent collectors, it must be assumed that the record is based on an error, probably due to a mixing of labels.

151 Amphidromus janus, Pfeiffer.

Bulimus janus, Pfeisfer, P. Z. S 1852, p 85, ibid, Conch-Cab, Bulimus, 1854, p 156, pl 48, figs 1-4, Gassies, Act Soc Linn. Bordeaux, xxiv, 1861, p 253, pl. 5, fig 5
Bulimus (Amphidiomus) janus, Pfeisfer, Malak Blatt ii, 1856, p 147, Hanley & Theobald, Conch Ind 1876, p xi, and footput 1 pl 10 85

note 1, pl 19, fig 5 (atricallosus in explan. plates, p 10) Cochlostyla (Canistium) janus, Adams, Gen Rec Moll 11, 1855

Amphidromus janus, Nevill, Hand List, 1, 18/8, p 126, Pilsbry, Man Conch ser 2, xiii, 1900, p 156, pl 58, figs 14-18

Original description —"B testa imperforata, dextrorsa vel simstrorsa, subfusiforimi-oblonga, solida, vix mitidula, lutea fascus 3 extus opace viridibus, intus nitide atro-castaneis, peristoma non attıngentibus, basalı latıssıma, varıcıbusque castaneis sparsis ornata, spira conica, acutiuscula, anfractibus 6-7 convexiusculis, ultimo } longitudinis subæquante, basi attenuato; columella verticalis, stricta, apertura obliqua, semiovalis, basi subangulata; peristomate subincrassato, breviter reflexo, albo, marginibus callo nigro-castaneo junctis.

"Long 47, diam 20 mill." (Pfeiffer)
Hab Burma Tayov, Mergui (Theobald)

Pfeisfer, when describing the species, gave the habitat "New Hebrides" from information supplied by Cuming, whose "habitats" have on so many occasions proved erroneous or unreliable. Gassies attributed the species to New Caledonia, also on the strength of a specimen, so-labelled, received by him from Cuming! Both these localities may be ignored and Burma taken to be the true habitat, the species having been collected at Mergui by Theobald, as recorded by Nevill in his 'Hand List of Mollusca in the Indian Museum' The shell, moreover, figured in Conch. Ind. as atricallasis, from Tavoy, has been referred—correctly I think—to the present species by Pilsbry, who considers that it "stands quite alone for an Amphidromus, having no close companions."

152 Amphidromus atricallosus, Gould

Bulimus atricallosus, Gould, Proc Boston Soc Nat Hist. 1, 1844, p 140; ibid, Boston Journ Nat Hist iv, 1844, p 457, pl 24, fig 3, Deshayes in Férussac, Hist. Nat' Moll ii, part 2, 1851, p 51, pl 180, figs 9, 10

Bulimus perversus, var d, Pfeiffer, Mon Helic Viv iii, 1853, p 308, ibid, Conch -Cab, Bulimus, 1854, p vi, pl 40, figs 10, 11.

Bulmus (Amphidromus) atricallosus, von Martens, Preuss Exp Ost-Asien, Zool. Theil, ii, 1867, p 77, ibid, Conch Mitth ii, 1883, pp 130, 131, ibid, Journ Linn Soc London, xxi, 1887, p 163 Amphidromus atricallosus, Semper, Reisen Arch Philipp 2te Theil, iii, 1877, p 147, pl 16, f 20 (teeth), Nevill, Hand List, i, 1878, p 126, Pilsbry, Man Conch ser 2, xiii, 1900, p 165, pl. 58,

ings 19-21
Amphidromus perversus, var atricallosa, Fulton, A. M. N. H. ser 6,

xvii, 1896, p 69

Bulimus eques, Pfeisser, Malak Blatt iv, 1857, p 158

Original description —"Testa solida, imperforata, oblongo-ovata, vix striata, sulphurea; anfr. 7 convexiusculis, ad suturam constrictis; apertura lunato-ovali, basi sub-effusa, labro albo, reflexo, marginibus callo atro junctis.

"Long 23, lat 1 poll"

"Shell imperforate, elongated ovate, solid, smooth, and shining, of a sulphur-yellow colour; whorls seven, moderately convex, somewhat girt in near the suture, last whorl nearly two-thirds the length of the shell, aperture ovate-lunate, somewhat angular at base, and slightly effuse; lips white, widely revolute, not flattened; columella white, the callus uniting the extremities of the peristome, and, as far within the shell as can be seen, pitchyblack, from the midst of it, extending across the penult whorl, is a line of the same color, showing the termination of a former stage of growth.

"Length $2\frac{1}{3}$ [=59 mm.], breadth 1 inch [=25 mm]" (Gould)

Hab Burma: Tavoy (Mason), Mergui forest and King Island (Anderson). Salanga (Weber); Penang (Martens), Salgoon (Mus. Cumma, Semper)

Both dextral and sinistral shells occur, but the former appear to

be more common than the latter.

153 Amphidromus moniliferus, Gould.

Bulimus moniliferus, Gould, Proc Boston Soc. Nat Hist. 11, 1846, p 99, 1bid., Otia Conch 1862, p. 198.

Bulimus (Amphidromus) moniliferus, Pfeiffer, Malak Blatt 11, 1856.

p 147, von Martens, Die Heliceen, ed 2, 1860, p 185

Amphidiomus moniliferus, Nevill, Hand List, 1, 1878, p. 1264

Fulton, A. M. N. H. ser 6, xvii, 1896, p 90, pl 7, fig 9,

Pilsbry, Man Conch. ser 2, xii, 1900, p 179, pl 62, figs 73, 74

Bulimus theobaldianus, Benson, A. M. N. H. ser 2, xix, 1857,

p 329, Hanley & Theobald, Conch. Ind. 1870, pl 19, fig 10,

1876, p xi, and footnote 8

Amphidromus theobaldianus, Theobald, J. A. S. B. xlv, 1876, p 187,

pl 14, fig 8

Amphidi omus schombin ghi, var theobaldi, Nevill, Hand List, 1,

1878, p 126

Buliminus (Rhachis) theobaldianus, Kobelt, Conch -Cab, Fam. Buliminidae, 1900, p 672, pl 102, fig 14

Original description —" Testa conico-oblongata, plerumque sinistrorsa, lævis, luteo-cinerea flammulis longitudinalibus, fascia suturali lineari, et fascia subsuturali interrupta fuscis; regione umbilicali fusca, fascia lutea divisa, anfr. 7, ultimo subcarinato, apertura subovata, basi angulata, sub-effusa; labro reflexo, rubropurpureo, ad columellam dilatato; fauce purpurea.

"Long $1\frac{1}{5}$ [=30 5 mm]; lat $\frac{7}{10}$ poll. [=17.75 mm]." (Gould)

Hab. Burma Tavoy (Mason)

154. Amphidromus sylheticus. Reeve.

Bulimus sylheticus, Reeve, Conch Icon 1849, pl 77, fig 564, Pfeiffer, Conch -Cab, Bulimus, 1853, p 68, pl 20, figs 25, 26, Hanley & Theobald, Conch. Ind. 1870, pl. 19, fig 9, Godwin-Austen, J A S. B xlv, 1876, p. 316

Bulimus (Amphidiomus) sylheticus, Pfeiffer, Malak. Blatt 11, 1856,

p 147

Amphidromus sinensis, var sylhetica (Benson), Nevill, Hand List, 1, 1878, p 127

Amphidromus sylheticus, Fulton, A. M. N H ser 6, xvii, 1896, p 79, Pilsbry, Man. Conch. ser. 2, xiii, 1900, p 189, pl 63, figs 97, 98.

"Shell sınıstral, umbilicate, ovate-conic, polished, striatulate, the first whorl weakly punctulate, greenish-yellow below the periphery, paler above, fading on the spire, the early whorls and apex whitish. Whorls 52, slightly convex, the last but weakly convex above, very convex, full, and sack-like below. Aperture ovate, oblique, slightly brown or ochre-tinted within; the peristome white, reflexed,

columella with slightly convex inner edge, broudly dilated, guttered at its union with the body of the shell; the dilated edge overlanging a rather large umbilicus, and a little thickened where it passes upon the parietal wall. Parietal cultus thin and transfuent." (Pildry)

Alt 26, diam 15, longest axis of aperture 11 mm. Alt 21, diam 14, longest axis of aperture 125 mm.

Hab India: southern slopes of Khasi and Garo Hills, Assam

(Godwin-Austen)

Attributed to Syliet, Eastern Humslayns, by Reeve. It-Col. Godwin-Austen states that its habitat is the southern slopes of the Khasi and Garo Hills, whereas Sylhet is a district in the plains of Lower Bengal, south of the Khasi Hills, and the specific name is, therefore, as Godwin-Austen points out, unfortunately misleading and inappropriate

The distinctly greenish-yellow colour of the lower portion, the sack-like base, and the sort of gutter at the root of the columnia

are said to be characteristic features.

155 Amphidromus masoni, Godicin-Airsten.

Bulant's masons, Godwin-Austen, J. A. S. B. xls, 1876, p. 316
Araphidromus masons, Fulton, A. M. N. H. ser. C., xvis, 1896, p. 81,
pl. 6, fig. 2., Filsbry, Man. Conch. ser. 2., xm, 1600, p. 189, pl. 62,
ing. 72
Amphidromus daflaents (Godwin-Austen), Nevill, Hand. List, 1.
1578, p. 127 (nom. nud.)

Original description — "Shell sinistral, acuminately oblong, thick, side of spire rather flat, whorls 7, smooth and shiny, under lens finely and spirally stricte, colour sea-green, intenser below the keel, paling towards the apex the columella dark purple, a narrow fillet of same colour borders the suture closely below, commencing at the upper and outer angle of the aperture. Aperture oval, angular above, hip slightly reflected. The last whorl slightly keeled." (Godwin-Austen)

Alt 1.2 [=30 5 mm], major diam 0 5 inch [=12 75 mm]

Hab India Dibiri Parbat, Dassa Hills, Assam (Goduin-Austen).
Similar in form to A. sylheticus, but the latter shell is smaller exhibits no trace of spiral striction, has its surface more polished, while the columellar margin and outer lip are pure white, and in dozens I have collected no trace of band is ever seen. In colour too sylheticus dissers in being lemon-jellow with a greenish tinge on the body-whorl (Godwin-Austen)

156. Amphidromus lepidus, Gould

Bulimus lepidus, Gould, Proc Boston Soc. Nat Hist vi, 1856, p 12, ibid, Otia Conch 1862, p 219, Hanley & Theobald, Conch Ind 1872, pl 84, fig 6

Amphidromus lepidus, Pilsbry, Man Conch ser 2, xii, 1900, p 190, pl 63, fig 99

Original description .— "T parva, plerumque sinistra, vix perforata, ovato-conica, elevata, polita, citrina; antr 6 convexis, ultimo ventricoso: sutura bene impressa, apertura subcircularia. peristomate albo, reflexo, ad columellam dilatato, extremitatibus approximatis"

"Axis $\frac{7}{8}$ [=225 mm], diam. $\frac{1}{2}$ poll [=125 mm]"

Hab Mergui Archipelago (Benjamin).

"A pretty shell, grouping with lævus, adams, and monilifera. but smaller, proportionally shorter and more ventricose, and differing entirely in colouring, texture, and the broadly rounded

form of the aperture."

Mr. Fulton considers lepidus and sylheticus identical states* that the types of both are in the British Museum labelled lepidus, is certainly marked "type" in the same handwriting, but the word "type" there is undoubtedly meant in the sense of "typical form," as the type on which Gould based his description is in the Albany Museum. The same label bears the

name sylheticus in Pfeiffer's handwriting

Prof. Pilsbiy is of opinion that as sylheticus is a species of the hills, and lepidus inhabits a region rather different faunally, the latter should be allowed to stand pending further comparisons of a good series of the Mergui form with Reeve's species. A lepidus has a more pyramidal shape Hanley and Theobald while admitting that the two forms approximate observe that Gould's shell is shorter, with more rounded whorls, and lacks the notch at the commencement of the pillar-lip

157. Amphidromus sinensis, Benson.

Bulimus sinensis, Benson, A. M. N. H. ser 2, vii, 1851, p 264, Pfeiffer, Conch. Cab, Bulimus, 1853, p 67, pl 20, figs 1, 2, Blanford, J. A. S. B. XXXIV, 1865, p 94

Bulimus (Amphidromus) sinensis, Pieiffer, Malak. Blatt. ii, 1856, p 147, von Martens, Die Heliceen, ed 2, 1860, p 185.

Amphidromus sinensis, Nevill, Hand List, 1, 1878, p 126, Fulton,

A M N II ser 6, xvii, 1896, p 80, Pilsbry, Man Conch. sei. 2, xiii, 1900, p 190, pl 62, figs 64, 65

Original description -"Testa perforata sinistrorsa, ovata-conica, glabra, lutescente, subtus purpureo-castaneo bifasciata; spira conica, apice obtusiusculo; antractibus 5½ convexiusculis, ultimo spiram æquante, fascus submediani basalique intra aperturam productis, columella subtorta, apertura obliqua, oblique ovata, peristomate planato-reflexo, livide purpureo, postice livide fusco, marginibus callo albido vix junctis, columellari albido breviter superne dilatato.

"Long 30, lat 18 mill; long apert 16, lat 12 mill" (Benson.) Hab Burma Pegu (Theobald, Stoliczka), Prome, Tongoop, Akyab (Blanford); India Khasi-Hills (Nevill). S. China (Cantor).

Mr. Fulton states that the type of this species cannot be found in the Benson collection, in the Cambridge Museum, and Prof Pilsbry suggests that it may not have been returned by Pfeiffer and is now perhaps in Dohrn's collection. As Pfeiffer, however, distinctly states that the type is in the Benson collection (Mon Helic. Viv. in, 1853, p. 320), and as, moreover, the Benson collection has experienced many vicissitudes, so that some other types likewise are not traceable, the more likely explanation, in my opinion, is that the shell must have gone astray.

A sincusts is said to resemble A. sylheticus in the globose base and groove at root of the columella, but to differ in being stouter in form, two-banded below, and with a brown streak behind the

lip, which is said to be pale lilac

I possess, however, two specimens from Laos, received in exchange from the Senckenberg Museum, Frankfurt a /M, which are ochreous yellow on the last whorl and bandless, one exhibits a very narrow dark brown patch occupying the groove at the root of the columella and extending a short way behind the basal hp; it can also distinctly be traced beneath the parietal callus around the columellar fold. This specimen has a white hp

Var. vicaria, Fulton

Bulmus sinen'is, Forbes & Hanley, Conch. Ind 1870, pl 21, figs 5, 6

Amphidromus sinensis, var vicaria, Fulton, A. M. N. H. ser 6, xvii, 1896, p. 80, Pilsbry, Man Conch ser 2, xiii, 1900, p. 191 (vicarius), pl. 62, figs. 67-69

"In most collections as sinensis, from which it differs in being not so broad in proportion to its length and in coloration. It is broader than sylheticus, and instead of being of an uniform green colour, it is yellow, with two (sometimes three) more or less distinct dark brown bands encircling lower part of last whorl. This variety varies a great deal in size and form. I give here the dimensions of two specimens out of a series in the British Museum. Long 33 mm, may diam. 17 mm; long 21 mm, may diam 14 mm." (Fulton)

Hab. Burma. Pegu, Chittagong

With regard to its being "not so broad in proportion to its length," this is a character not always to be relied upon, as I possess a specimen, received from Mr Fulton, which measures, Long 20, diam 12 mm. The same remark applies to its relative proportion as compared with A sylheticus, as will be seen from the following observation

"A specimen from Chittagong (fig. 69) is more slender than A sylheticus, not 'baggy' below, and almost white with a faint ochre band above each of the purple-black ones. The apical whorls are corneous-white, and weakly punctate, and there is a perceptible groove at the root of the columella. The peristome is pure white.

and there is no dark stripe behind the lip. Alt 26, diam. 145, longest axis of aperture 13 mill " (Pilsbry.)

Var. gracilis, Fulton

Amphidi omus sinensis, var. gi acilis, Fulton, A. M. N. H. ser 6, xvii, 1896, p. 80, pl. 6, fig. 10, Pilsbry, Man Conch. ser 2, xiii, 1900, p. 192, pl. 62, fig. 71

"A very narrow solid form; pale yellow, with two purplebrown bands at lower part of last whorl; the third and fourth whorls encircled with four rows of light brown spots, lip and columella thickened and expanded." (Fulton.)

Pilsbry suggests that this form may belong nearer A flavus, but graciles is much more slender and has a more elongated.

aperture

Hab. Burma Pegu

158. Amphidromus andamanicus, Hanley & Theobald.

Bulimus and amanicus (Thorp MS), Hanley & Theobald, Conch Ind 1875, p 59, pl 148, fig 10

Amphidromus sp, Nevill, Hand List, 1, 1878, p 127, no 21

Amphidromus andamanicus, var nicobarica (Nevill MS), Godwin-Austen, P Z S. 1895, p 450

Amphidromus fin cillatus, var. andamanica, Fulton, A. M. N. H. ser 6, xvii, 1896, p. 77

Amphidiomus and amanicus, Pilsbry, Man Conch ser. 2, xiii, 1900, p 217, pl 66, fig 41

Shell sınıstral, elongate-conoid, smooth and glossy, finely striated and covered with close minute spirals, the protocouch white or buff-white with a pale or dark brown apex, the later whorls pale or dark buff, marked with transverse (sometimes oblique) broad dark brown or blackish bars, some of which are occasionally forked at the upper extremity, they increase in width and become more distant on the later whorls, but on the last whorl decrease and become more crowded, the lower half of the whorl being covered by two rather broad spiral bands, one infra-peripheral and the other placed around the columella, the two sometimes coalescing, the latter part of the last whorl is sometimes covered with light or dark green which is occasionally disposed in transverse streaks; a narrow brown sub-sutural band, edged with white, ascends the greater part of the spire. Whorls 6-61, convex. Aperture semiovate, three-sevenths the length of the shell, peristome white, rather thin, slightly expanded, not reflexed, parietal callus very thin; columella white, vertical, straight, making a distinct angle with the basal margin, reflexed and adnate at the insertion, leaving a slight narrow slit of the umbilicus

Length 35, diam 19 mm; height of aperture 15, width 85 mm Length 30, diam. 16.5 mm.; height of aperture 13, width 75 mm. Hab. Andaman Islands Cocos Island and Port Blair (Godwin-Austen); Mt Harriet, Andaman Island (Roepstorff, Nevill,

Stoliczka). Nicobar Islands · Katchall (Stoliczka)

This species has not previously been described and is known only from the figure in Conch. Ind copied by Pilsbry. The above description is drawn up from a number of specimens in my own collection. Mr. Fulton considers it variety of A furcillatus, Mousson, a Javanese shell, but Prof. Pilsbry, while admitting that the similarity in colouring to that species and A. quadrasi, from Balabac, is remarkable, thinks it inadviable, on account of the widely separated localities, to unite andamanicus with either. I do not, however, consider the similarity in colouring particularly striking, as in the other two species the prevailing ground-colour is a bright yellow, and I have never seen the infra-peripheral and columellar bands, so characteristic a feature in A andamanicus, in either. A furcillatus, moreover, is a more slender species and has the columella more oblique and the aperture proportionally less high.

On the other hand A. pictus, Fulton, also from Java, bears a striking resemblance in its pattern of marking to the Andaman shell, having several of the transverse bars forked above and exhibiting likewise the infra-peripheral and columellar spiral bands. It has also the same conical contour, but lacks the green colouring on the last whorl frequently seer in A. andamanicus.

Lt-Col Godwin-Austen, in discussing the form from the Nicobar group, states that "it is somewhat larger than Andaman shells, and in colour is far paler and with few markings, and those pale These differences might not hold good in a large series"

Subgenus BEDDOMEA, Nevill

Amphidromus, subgenus Beddomea, Nevill, Hand List, 1, 1878, p 127; Pilsbry, Proc Malac Soc. London, 1v, 1901, p 158, pl 16 (anatomy), 1bid, Man Conch ser 2, xiv, 1901, p. 1, pl. 2, figs 21-23 (anatomy)

Type, Bulimus ceylanicus, Pfeisfer.

Range Southern India and Ceylon.

"Shell umbilicate or perforate, oblong-conic, often carinated at the periphery, white or with brown bands or streaks, aperture

usually quite oblique; peristome reflexed.

"Genitalia of typically epiphallogonous type, the flagellum longer than and the ephiphallus about as long as the penis. Duct of the oblong or ovate spermatheca lengthened, more than double the length of the penis. Penis with a large apical papilla

"Lung having the pulmonary vein without large branches, the venation densest on the intestinal side and near the pneumostoms, weak or well developed on the cardiac side Kidney long and

narrow, nearly or quite the length of the pericardium. Ureter reflexed, the secondary ureter a closed tube

"Muscles Retractor of the penis inserted on the diaphragm as usual. The pharyngeal retractor is united to the right ocular and pedal band far forward; the left ocular muscle passes to the right of the genitalia, not between the male and female branches.

"Jaw well arched, thin, with its lower margin crenulated by 10-14 flat ribs, which seem separated by narrow intervals in the median part, but are contiguous or overlapping towards the ends It is similar to that of some species of *Papuina*, intermediate between the plaited and the ribbed types

"Radula of the usual form in Helicidæ The transverse rows of teeth bent at a wide angle in the middle. Rhachidian and admedian teeth with single, long, broadly rounded cusps. These pass by a gradual transition to the lateral type, in which the tooth

is inclined and bears a three-lobed cusp

"The shell does not have the brilliant coloring of many Amphidromus, and is minutely punctulate, at least on the spire. The area of distribution is separated from that of true Amphidromus. I have elsewhere shown that Beddomea agrees with Amphidromus in the long, band-like kidney, the pattern of lung-venation, the arrangement of the muscles (except the eyes and retractors), the reproductive system, and the jaw. It differs from Amphidromus in having the eye retractor muscles to the right of, instead of between the branches of the genitalia, in having the cusps of the teeth of the median fold of the radula broadly rounded and simple instead of deeply cloven into three cusps, as all the side-teeth are in the restricted group of Amphidromus, and finally in having the radula longer than in Amphidromus

"In view of the general agreement, it scarcely seems well-advised to accord Beddomea higher rank than that of a subgenus of Amphidromus None of the three structural differences mentioned is of much importance, though I do not doubt that they will prove constant in Beddomea. When some of the species of Amphidromus which are conchologically nearest Beddomea (such as A sylheticus) come to be examined, transitions may not unlikely be found in the dentition. In the long flagellum, Beddomea is more like the larger, amphidrome species of Amphidromus than the smaller, invariably sinistral species, which, so far

as known, have this organ much shorter." (Pilsbry)

Rey to the Species.

a	Periphery rounded	ceylanıcus
ь	Periphery angular	
	bi Shell elongate-conoid, whorls convex	intermedius
_		physalts
C	Pemphery strongly cannate	
	c¹. Dextral; Čeylon	albizonatus
	c ² Sunstral Southern India	calcadensis

159. Amphidromus trifasciatus. Gmelin

Helix trifusciatus tranquebarica, Chempitz, Conch - Cab ix, part 2, 1780, p 155, pl 134, figs 1215

Helix trifasciata, Gmelin, Syst Nat i, part 6, 1790, p 3642

Bulimus trifasciatus, Bruguière, Encycl. Meth., Vers. 1, 1789, p 317, Reeve, Conch Icon v, Bulimus, 1848, pl. 39, fig 237; Pfeisser, Conch-Cab, Bulimus, 1853, p 50, pl 10, figs 6, 7, var pl. 41, figs 16, 17; Layard, A M N H, ser 2, xi, 1853, p 226, Hanley & Theobald, Conch Ind 1870, pl 21, fig 3 Bulimus (Amphidromus) trifacciatus, Pfeiffer, Malak Blatt 11, 1856. Bulimmus (Cerasius) trifasciatus, von Martens, Die Heliceen, ed 2. 1860, p 232, Nevill, Hand List, 1, 1878, p 132 Amphidromus trifasciatus, Jousseauine, Mem. Soc. Zool France, vii, 1894. p 295 Buliminus (Beddomea) trifasciatus, Kobelt, Conch-Cab, Fam Buliminidae, 1900, p. 677, pl 102, fig 22 Amphidromus (Beddomea) trifasciatus, Pilsbry, Man Conch ser 2,

xiv, 1901, p 3, pl 1, figs 1-6, 8
Rhachus trafasciata, Kobelt & Möllendorff, Nachr D Malak Gesells 1903, p 39

Bulimus ceylanicus, Hanley & Theobald, Conch Ind. 1870, p. 11, pl 21, fig 2, 1875, p 59, pl. 148, fig 9
Buliminus (Beddomea) ceylanicus, Kobelt, Conch -Cab, Fam Buli-

minidae, 1900, pl. 103, hgs 5, 6

Amphidromus (Beddomea) ceylanicus, Pilsbry, Proc Malac Soc. London, 1v, 1901, p 159, pl 16, bg 3 (jaw)

Bulmus fuscoventrus, Benson, A M N 11 ser 2, xvin, 1856, p 98

(=jur)

"T. umbilicata, ovato-oblonga, solidula, minutissima striatula, nitida, albida, fulvido-nebulosa, fascus pluribus (plerumque 3) castaneis ornata, spira conica, acutiuscula, anfr. 6 planiusculi, ultimus 3 longitudinis æquans; columella subrecta; apertura ovalis, perist album, late expansum, margine columellari dilatato. patente" (Pfeiffer.)

"Long 27, diam, 13 mill. Ap intus 11 mill longa, 7 lata" Hab. India: Tranquebar (Chemnitz) [7] Ceylon: Tamanka

(Layard), Matella, Colombo, Uda Pussellawa (Collett)

The species varies in size I possess specimens 30 mm long. One has the upper two bands confluent, 16 mm in diameter forming a broad zone which ascends the whole spire; another shows one distinct narrow band, with two indistinct ones on either side on the upper portion of the latter part of the last whorl,

while the lower portion is ornamented with a broad dark brown band below the peripheral white girdle and a narrow one around the umbilicus. Another specimen is almost unicolorous white with a narrow brown band around the umbilicus. The original habitat—Tranquebar—recorded by Chemnitz, I consider extremely doubtful It is a well known fact that formerly less importance was attached to locality than is the case at the present day.

Var. rufopicta. Benson

Bulmus rufopictus, Benson, A. M. N. H. ser 2, xvii, 1856, p. 96, Hanley & Theobald, Conch. Ind. 1870, pl. 21, fig. 10 Bulimus (Cerastus) rufometus, Nevill, Hand List, 11, 1878, p. 132 Amphidromus rufopictus, Jousseaume, Mém Soc Zool France, vii. 1894, p 295 Buliminus (Beddomea) rufopictus, Kobelt, Conch.-Cab, Fam Buli-

mınıdae, 1900, p 670, pl 102, fig 11.
Amphidromus (Beddomea) trifasciatus, var sufometus, Pilsbry, Man.

Conch ser 2, xiv, 1901, p 5, pl 1, fig 9.

Smaller than typical trifasciata and having the upper portion of the spire usually streaked transversely.

Hab Ceylon Akurambode (Lauard): Kandy (Collett).

160. Amphidromus bontiæ. Chemnitz

Helix bontia, Chemnitz, Conch-Cab ix, part 2, 1786, p 156, pl 134,

figs 1216, 1217

Bulimus bontiae, Gray, Ann Philos, N s ix, 1825, p. 414
Bulimus bontiae, Pfeiffer, Conch-Cab, Bulimus, 1841, pl 10, figs 8, 9, 1853, p 51, Reeve, Conch Icon. v. Bulimus. 1848, pl 48, fig 315, Hanley & Theobald, Conch Ind 1874, p 34, pl 80, fig 5

Amphidromus (Beddomea) bontia, Nevill, Hand List, 1, 1878, p 128

Buliminus (Beddomea) bontine, Kobelt, Conch.-Cab, Fam. Buli-

minidae, 1900, p 669, pl 102, fig 10

Rhachis bontiae, Kobelt & Mollendorff, Nachr Deuts Malak. Ges. 1903, р 37.

Shell narrowly perforate, ovate-conoid, thin, faintly striated transversely, with microscopic impressed spiral lines above and below, white, with three narrow pale brown bands, the middle one at the periphery. Spire conoid, apex acute, suture shallow Whorls 5, slightly convex, the last ventricose, scarcely descending in front, equalling in height the remainder of the spire, at first subangulate at the periphery, becoming rounded towards the Aperture pyriform-obovate; peristome thin, margins slightly expanded, columellar margin dilated and reflexed over the narrow perforation of the umbilicus.

Long. 28, diam. 18 mm (Konig), Southern India (Jerdon, Hab. India Bengal Stoliczka)

This species in contour approximates most nearly to A physalis, but the shell is thinner and is ornamented with narrow pale brown spiral fascine. The specimen figured in Conch. Ind. only possesses two bands, whereas the type, figured by Chemnitz, has three. The shell depicted by Reeve, from Benson's collection, is also encircled by three bands. The specimen in the Benson collection—presumably the one figured by Reeve—kindly forwarded to me for inspection by Dr. L. Doncaster, in charge of the University Museum of Zoology, Cambridge, has somewhat deteriorated, having a considerable hole in the body—whorl and two small ones near the parietal callus, the peristome is also damaged. This is probably owing to its having been stuck on a tablet. The above diagnosis has been drawn up from this shell.

161. Amphidromus physalis, Benson

Bulimus physalis, Benson, A. M. N. H. ser 2, xix, 1857, p. 328, Blanford, J. A. S. B., xxxv, 1866, p. 38, Hanley & Theobald, Conch. Ind. 1870, pl. 21, fig. 9

Helia (Geoti ochus) physalis, von Martens, Die Heliceen, ed 2, 1860,

p 168

Amphidromus (Beddomeu) physalis, Nevill, Hand List, 1, 1878, p 127, Pilsbry, Man Conch ser 2, xiv, 1901, p 8, pl 1, fig 13

Helia (Corasia) physalis, Pfeiser & Clessin, Nomencl Helic Viv

1881, p 200

Bulimmus (Beddomea) physalis, Kobelt, Conch-Cab, Fam Bulimindae, 1900, p 678, pl 103, fig 1.

Original description — "Testa subobtecte perforata, ovato-conica, tenuiuscula, oblique striatula, albida, nitente; spira conica, apice obtusato, sutura leviter impressa, anfractibus 5½ superne subplanatis, primis granulatis, cæteris striis spiralibus minutissimis decussatis, ultimo tumidiusculo ½ longitudinis æquante, ad peripheriam plerumque angulato, apertura ampla, obliqua, truncato-pyriformi, peristomate expanso, marginibus reflexis, callo tenui junctis, columellari superne latissimo, appresso, oblique leviter impresso, umbilicum angustum persium fere tegente" (Benson)

Long 27-28, diam 16-17 mm, long ap. 14-16, lat 9-10 mill Hab India Khoonda Ghat, Nilgiris (Jerdon), Anamullay

Hills (Beddome)

"Well distinguished from the Cingalese species albizonatus, ceylanicus, and intermedius, by its ventricose form, the more ample aperture, and the mode of sculpture. A perfect specimen in the Museum of Indian House and a young one from Dr Jerdon have the periphery angulate, an adult specimen of Dr Jerdon's being deficient in this feature" (Benson)

162 Amphidromus albizonatus, Reeve.

Bulinus albizonatus, Reeve, Conch Icon v, Bulinus, 1849, pl 81, fig 604, Pfeiffer, Mon Helic Viv 111, 1853, p 330, 1bid, Conch - Cab, Bulinus, 1854, p 155, pl 49, figs 1, 2, Hanley & Theobald, Conch Ind. 1870, pl 21, fig 8

Bulimus ceylanicus, var albizonatus, Layard, A. M. N. H. ser. 2, xi, 1853, p. 226.

Helix (Geotrochus) albizonata, von Martens, Die Heliceen, ed 2, 1860, p. 168

Bulimus (Amphidromus) albizonatus, Pfeisser, Malak Blätt 11, 1856,

p 147

Amphidiomus (Beddomea) albizonatus, Nevill, Hand List, 1, 1878, p 127, Pilsbry, Proc Malac Soc London, iv, 1901, p 159, pl 16, figs 1, 5 (anatomy), ibid, Man Conch ser 2, xiv, 1901, p 7, pl. 1, figs 14-16

Cochlostyla (Phengus) albizonala, Pfeiffer & Clessin, Nomencl Helic.

Viv. 1881, p 210

Buliminus (Beddoniea) albizonatus, Kobelt, Conch-Cab, Fam Buliminidae, 1900, p 680, pl. 103, fig 4

"T perforata, elongato-conica, solidiuscula, oblique striatula, vix nitidula, sub epiderinide pallide straminea albida, spira conica, obtusa; sutura submarginata, anfr. 6 plani, ultimus spiia paulo brevior, infra medium acute angulatus et albo ronatus; columella leviter arcuata; apertura obliqua, truncato-ovalis, subtetragona; perist. late expansum, marginibus subparallelis, callo tenui junctis.

"Long 24 diam 15 mill. Ang. perist. 135 mill. longa 10 lata"

"Long. 24, diam. 15 mill Ap. c. perist. 135 mill longa, 10 lata."

(Pfeiffer)

Hab Ceylon (Nevill), Matella (Layard); Galle (Reeve),

Udagama (Collett)

In discussing the present species, Prof Pilsbry states "numerous specimens before me are smaller than Reeve's type, measuring from length 29, diam 18, to length 23, diam 14 mill. The thin cuticle is more or less yellow tinted beneath, and the periphery either marked by a white line or not. The angle is frequently almost completely obsolete on the face of the whorl, even when strong on the back. The spire is punctulate or densely subgranulose, at least above, but not on the last whorl"

He continues "Kobelt (Conch-Cab. p. 680) states that he gives the figure from Conch Icon on his plate 103, fig. 4, but he evidently did not do so." Here Pilsbry confuses Conch Icon. with Conch Ind, for Dr Kobelt states that his figure is copied from the latter, and a comparison with that work at once establishes the fact that the figure there given constituted the basis of his

illustration

Vai simoni, Jousseaume.

Phengus simoni, Jousseaume, Mém Soc Zool France, vii, 1894, p 296, pl 4, fig 7
Amphidiomus (Beddomea) albizonatus, var simoni, Pilsbry, Man.
Oonch ser 2, xiv, 1901, p 7, pl 1, figs 17, 18

Is said to differ from typical albizonatus in having one whorl less, a more prominent keel, more flattened whorls, in the shell being white, and in the absence of a white keel-zone Pilsbry figures a shell from Udagama, received by him from Collett I have not seen authentic specimens, but the variety does not appear to me to be well differentiated.

163. Amphidromus intermedius, Pfeiffer

Bulimus intermedius, Pfeisser, P Z S 1854, p 291, ibid, Novit. Conch ser 1, 1, 1855, p 30, pl. 8, hgs. 10, 11. Hanley & Theobald. Conch Ind 1870, pl 19, tigs 6, 8

Helix (Geotrochus) mesogena (nom. mut.), von Martens, Die Heliceen.

ed 2, 1860, p 168 Bulimus (Amphidromus) intermedius, Pfeiffer, Malak Blatt. 11, 1856, p 147.

Amphidromus (Beddoniea) intermedius. Nevill. Hand List, i. 1878. p 127, Pilsbry, Proc Malac Soc. London, 1v, 1901, p 158, pl 16, figs 2, 4, 6, 7 (anatomy)

Cochlostyla (Phengus) intermedia, Pfeisser & Clessin, Nomenci Helic

Viv [83], p 210

Buliminus (Reddomea) interinednis, Kobelt, Conch -Cab , Fam Buli-

minidae, 1900, p 679, pl 103, figs 2.3

Amphidromus (Beddomea) ceylanicus, var. intermedius, Pilsbry, Man. Conch ser 2, xiv, 1901, p 0, pl. 1, hgs 10-12

Original description .- "T. perforata, elongato-conica, solidula, oblique striatula et puncturata, nitida, alba; spira conica, obtusula; sutura levis, sumplex; anfr. 6 planiusculi, ultimus 3 longitudinis submanans, infra medium subangulatus, basi turgidus : commella leviter plicata, subrecedens, apertura obliqua, truncatoovalis: perist sublate expansum, reflexiusculum, marginibus callo tenui junctis, columellari plano, dilatato, triangulari.

"Long 34, diam, 16 mill, ap c perist. 17 mill, longa, intus 8

lata" (Pfeiffer.)

Hab Ceylon (Thwaites, Nevill)

A intermedius is more angulate at the periphery than A ceylanicus, the apex is more obtuse and the columellar margin more triangularly dilated and flattened.

164 Amphidromus ceylanicus, Pfeiffer.

Bulimus (Amphidromus) ceylanicus, Albers, Die Heliceen, 1850.

p 139

Helia (Geotrochus) ceylanica, von Martens, Die Heliceen, ed. 2, 1860, p 168

Amphidromus (Beddomea) ceylanicus, Nevill, Hand List, 1, 1878. p 127, Pilsbry, Man Conch ser 2, xiv, 1901, p 5, pl 1,

Cochlostyla (Phengus) ccylanicu, Pfeisser & Clessin, Nomencl. Helic.

Viv 1881, p 210

Bulimmus (Beddomca) ceylanicus, Kobelt, Conch.-Cab, Fam Buliminidae, 1900, p 680 (excl figures)

Original description '-" T aperte perforata, ovato-conica, solida. oblique striatula, nitidula, alba, spira conica, acutiuscula, anfr. 6 192 HELICIDÆ

planiusculi, ultimus 3 longitudinis subæquans; columella leviter arcuata; apertura truncato-ovalis, perist late expansum, reflexiusculum, margine columellari dilatato, reflexo, patente" (Pfeiffei)

Long 27, diam. 14 mm.

Hab. Ceylon (Templeton); S. Prov. (Nevill)

165 Amphidromus calcadensis, Blanford.

Bulimus calcadensis (Beddome MS), Blanford, J A S B xxxix, 1870, p 18, Hanley & Theobald, Conch Ind 1875, pl 148, figs 2, 3

Geoti ochus calcadensis, Theobald, J A S B xlv, 1876, p 187, pl 14,

fig 7

Amphidi omus (Beddomea) calcadensis, Nevill, Hand List, 1, 1878, p 127, Pilsbry, Man Conch ser 2, xiv, 1901, p. 9, pl 1, figs 19, 20

Cochlostyla (Phengus) calcadensis, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 210

Buliminus (Beddomea) calcadensis, Kobelt, Conch -Cab, Fam Buliminidae, 1900, p 681, pl 103, figs. 7, 8

Original description—"Testa sinistrorsa, sub-obtecte perforata, elevato trochiformis, solidula, striatula, albida, epidermide fulva? (vel flavescenti, forsan varie colorata) obtecta, spira conica, apice obtuso, sutura impiessa. Anfr. 5½ convexi, regulariter crescentes, ultimus ¾ longitudinis sub-æquans, carinatus, subtus convexus, antice tumidior. Apertura diagonalis, sub-rhomboidea, peristoma non incrassatum, expansiusculum, marginibus distantibus, callo tenui junctis, columellari triangulatim reflexo, perforationem fere tegente

"Long 23, diam 17 mm, ap. c. perist. 11 mill longa, intus 8

lata" (Blanford)

Hab India . Calcad Hills, Travancore (Beddome)

"Of this peculiar sinistral heliciform Bulimus a solitary specimen, much weathered but perfect, was found by Major Beddome It is evidently a coloured shell but only traces of the epidermis remaining. It is allied to B. albizonatus, By, and B. intermedius, Pfr, of Ceylon, but is sinistral and has a shorter,

more conical form." (Blanford.)

A specimen in the Theobald collection in the British Museum, probably the one figured in Conch Ind, although also rather weathered, has the periostracum intact on some parts of the last whorl and exhibits traces of extremely minute spiral sculpture, a feature also observed in other species of *Beddomea* The peripheral keel is ornamented with a narrow pale brown band which can be traced some distance up the spire, and the protoconch is pale fuscous It measures: length 19, diam. 145 mm.

Genus APATETES,* g. n

Shell conoid, rather thin, carinate, covered perforate

166 Apatetes bourdilloni, Theobald.

Corasia bourdillonii, Theobald, J. A. S. B. vlv, 1876, p. 185, pl. 15, fig. 3
Nanina bourdilloni, Nevill, Hand List, 1, 1878, p. 30
Cochlostylii (Corasia) bourdillonii, Pilsbry, Man. Conch. ser. 2, vii, 1891, p. 127, pl. 33, fig. 55

Original description —"Testa conoidea, obtecto-perforata, carinata, tenui, polita, albida, translucente, sub epidermide pallide straininea et decidua lineis exilissimis flexuosis spiraliter ornata Anfractibus 4½, celeriter crescentibus, ad apicem mammillatum piulo convexis, sed ultimo supra planato et circa umbilicum paulo inflato Apertura inagna subquadrata; marginibus simplicibus callo tenuissimo junctis

"Diam maj 254, min 195, alt 148, aperturæ alt 16, ejusdem

lat 14 mm" (Theobald)

Hab India Trevandrum, prov. Travancore (Theobald)

As Prof Pilsbry correctly observes. "Judging from the sharp lip, as well as the locality, this is no Corasia. It may prove to be a Nanina" Pending further information he, however, considered it advisable to retain it there, although in vol ix of the Manual of Conchology he does not include it in the genus. Its position is very uncertain, and it is not at all improbable that the thin, sharp, peristome is an indication that the specimens are not fullgrown. I was at first inclined to regard it as a member of the genus Euplecta, but the elevated conoid spire and its superficial, incised, close, way spirals—so totally different from the sharply cut, decussating spirals to be observed in that genus—are features which do not, I consider, permit its inclusion there. The texture of the shell rather approaches that exhibited by the subgenus Beddomea and I, therefore, propose to place this new genus provisionally next to Amphidromus.

Genus GANESELLA, Blanford.

Ganesella, Blanford, A. M. N. H. ser 3, x1, 1863, p. 86, Pilsbry, Man Conch. ser 2, 1x, 1894, p. 168, pl. 60, figs 1, 2, frontispiece, figs 1, 2 (anatomy) (G. japonica)
Satsuma, A. Adams, A. M. N. H. ser 4, 1, 1868, p. 463, Kobelt in Semper, Reisen Philipp x, 1906, p. 53
Trochomorphoides, Nevill, Hand List, 1, 1878, p. 80
Fruticotrochus, Kobelt, Fauna Moll. Extramar. Japoniae, 1879, p. 48

Trpe, Helir capitium, Benson

^{*} ara-nins, a deceiver

Range India and Farther India to China and Japan, Malay

Archipelago and Philippine Islands

"Shell more or less trochiform, umbilicated (or rarely imperforate), rather thin; light coloured, plain or with a peripheral line, surface with growth-lines only or densely spirally striate; whorls $4\frac{1}{2}$ to 6, the last a little descending in front. Aperture oval or angular-lunate, oblique, toothless or with a blunt columellar fold; lip expanded, broadly dilated at columellar insertion.

"Animal (of G. japonica) with the foot very long and narrow, sole not distinctly tripartite; upper surface finely and feebly granular, back with a pair of dorsal grooves, no facial grooves,

tail narrow, long, with a median longitudinal groove above.

"Jaw arcuate with about 9 ribs denticulating the lower margin "Radula of the type usual in ground snails Middle tooth with mesocone only developed, shorter than basal plate, side-cusps represented by slight lateral extensions Laterals similar but with the cusp longer. Marginals with oblique, bifid inner cusp and an ectocone.

"Genital system having the penis long and twisted, ending in a curved blind sack with corrugated inner walls; epiphallus long, bearing the retractor, terminating in a flagellum and the vas deferens. Vagina extremely long, the spermatheca duct inserted high Spermatheca oblong, on a stout duct, neither duct noi bulb being bound to uterus. No dart sack or mucus glands" (Pitsbry)

167. Ganesella acris, Benson.

Heirx acris, Benson, A. M. N. H. ser 3, 111, 1859, p. 387, Hanley & Theobald, Conch. Ind. 1870, pl. 54, fig. 6

Helix (Trochomorphoides) acris, Godwin-Austen, J. A. S. B. xlv, 1876, p. 312, Nevill, Hand List, 1, 1878, p. 80

Helix (Patula (Trochomorpha)) acris, Tryon, Man. Conch. ser 2, 111, 1887, p. 74, pl. 14, fig. 1

Ganesella acris, Pilsbry, Man. Conch. ser 2, ix, 1894, p. 170

Helix puellula (Benson, MS), Theobald, J. A. S. B. xxiii, 1858, p. 319 (nom. nud.)

Original description:—"Testa anguste umbilicata, elevatoconica, trochiformi, oblique striatula, obsolete granulosa, subtus
minutissime spiraliter striata, albida, spira elongato-conica,
lateribus planis, apice obtusiusculo, sutura leviter impressa,
anfractibus 6½ planulatis, ultimo vix descendente, ad peripheriam
acute carinato, basi planiusculo, apertura valde obliqua, tetragonolunata, peristomate superne expansiusculo, subtus expanso,
reflexiusculo, margine columellari late angulato-reflexo, umbilicum
partur celante

"Diam maj 10, min. 9, axis 9 mill." (Benson.)

Hab. India. Khasi Hills, Teria Ghat (Theobald, Godwin-Austen); Naga Hills (Roberts), Dafla Hills (Godwin-Austen)

Benson states that it approaches the larger *H. capitum*, of the hill region south of the Gangetic angle, but besides the absence of the peculiar colouring of that species, it is distinguished by its more elongate and regular coincal form and by the flatter base He continues, "I had affixed the MS name of *puellula* to this shell in my report to Mr Theobald, but on account of its similarity to *H. puella* of the late Mr. W. J. Broderip, I have deemed it advisable to adopt a more distinct and expressive designation on publishing a description"

The shell Benson had before him when describing the species was much weathered, and he thought that the sculpture and colour might eventually require an amended description. He referred to a faint rufous tint, not to be detected elsewhere, towards the termination of the keel. A specimen in my collection, with the periostracum in excellent condition, enables me to confirm this and to supplement the description in this respect. The shell is whitish corneous and the keel has a narrow rufous border above and below,

this can be traced a long way up the spire

Dautzenberg and Fischer with the present species a shell from Tonkin previously described by them as Satsuma lantenoise Another form from Perak, described by Crosse as Helix (Geotrochus) perakensis, they consider merely a variety of G acris

168 Ganesella scenoma, Benson

Helix scenoma, Benson, A. M. N. II. ser 3, xi, 1863, p. 319, Hanley & Theobald, Conch. Ind 1870, pl. 53, fig. 5, var. figs. 3, 4. Helix (Planisma) scenoma, Nevill, Hand List, 1, 1878, p. 79. Helix (Geotiochus) scenoma, Pfeitfer & Clessin, Nomenci. II.elic. Viv. 1881, p. 193, Tapparone Canefri, Ann. Mus. Civ. Genova, ser. 2, vii, 1899, p. 325. Helix (P. Satsuma) scenoma, Pilsbry, Man. Conch. ser. 2, vii, 1891, p. 83, pl. 18, fig. 54, var. fig. 53. Ganesella scenoma, Pilsbry, Man. Conch. ser. 2, ix, 1895, p. 170.

Original description:—"H testa anguste infundibuliformiumbilicata, subgloboso-conoidea, oblique irregulariter striata, striis minutissimis spiralibus decussata, sub epidermide cornea albida, carina interdum fascia rufo-castanea ornata, spira conoidea, apice obtusiusculo, sutura impressa; anfractibus 6, convexiusculis, ultimo antice vix descendente, ad peripheriam obtuse subcompressocarinato, subtus convexo, circa umbilicum compresso, apertura obliqua, subquadrato-lunata, peristomate expansiusculo, margine columellari reflexiusculo" (Benson)

Diam maj 16, min 14, axis 11 mill

Hab Burma Moulmain (Benson, Fea); Pegu (Theobald, Nevill)

^{*} Journ Conchyl lvi, 1908, p 181

The most depressed of all the Indian forms of Ganesella, somewhat resembling the Siamese G. rostrella. The peripheral band is A slightly more elongated variety is figured in sometimes absent

Conch. Ind (pl 53, figs 3, 4)

Some shells labelled H. mildon, in the Theobald collection. British Museum, proved upon examination to pertain to the present species One of these, measuring 15 13 9 25 mm, has the peripheral band on the pinched keel, but the others are without the band, they are all more depressed than typical scenoma, while the umbilious is somewhat narrower.

169 Ganesella capitium, Benson.

Helix capitum, Benson, A. M. N. II ser 2, n, 1848, p 160; Reeve, Conch. Icon vii, 1852, pl 125, fig. 749; Pfeiffer, Conch. Cab, Helix, iii, 1854, p 291, pl 125, figs. 3, 4; Hanley & Theobald, Conch. Ind 1870, pl 14, fig. 5, Morelet, Ser. Conch. iv, 1875, p 254.

Namna (Trochomorpha) capitum, von Martens, Die Heliceen, ed. 2,

1860, p 61

Helii (Planispi a) capitum, Nevill, Hand List, 1, 1878, p 78
Helii (Ganesella) capitum, Nevill in Anderson, Zool. Res Two
Exped West Yunnan, i, 1878, p 880

Trochomorpha (Nigratella) capitium, Pfeiffer & Clessin, Nomencl

Helic Viv 1881, p 81

Helix (Patula (Trochomorpha)) capitum, Tryon, Man Conch

ser 2, m, 1887, p 74, pl 14, fig 99

Trochomorpha capitum, Morelet, Journ Conchyl xxxvn, 1889, p 125, P Fischer, Bull Soc Hist. Nat Autun, iv, 1891,

Ganesella capitum, Pilsbry, Man Conch ser. 2, ix, 1894, p 170, pl. 55, fig 18, Blanford, Proc Malac Soc London, v, 1903, p 278

Lulota (Ganesella) harrola, subsp carmella, Mollendorsf, Nachr Blatt D Malak Ges xxxxx, 1902, p 158

Original description - "Testa perforata, globoso-comica, subtrochiformi, lavigata absque nitore, rufescente cornea, subdiaphana, opuciter albido-lacininto-strigata et marmorata; spira conica, apice obtuso, anfractibus 5½ convexiusculis, ultimo carina filiformi cincto, basi convexa, sutura impressa, marginata, apertura rotundato-tetragona; peristoniate recto, supra expansiusculo, infra subreflexo; margine columellari late reflexo perforationem semitegente." (Benson)

Diam maj. 14, min 13, axis 11 mm.

Upper Burma: Asa Hab India · Sikrigali, Behar (Boys) Upper Burma: Asa (Blanford), Kabyuet and Kalawat (Anderson) Siam (Bocourt. Pavie, Daly, Roebelen, Fr uhstorfer). Cambodia (Mouhot, specimens in Cuming Coll. Brit Mus.).

A brightly coloured species, the dark brown cuticle being irregularly covered by finminulated streaks of opaque creamy white

This bright coloration would naturally lead to the inference that the animal is of arboreal habit and it is not, therefore, surprising to find that Blanford records with regard to hariola—a closely allied form—that it is found chiefly on trees. A feature, to which no reference appears to have been made by any writer, is the presence, not only on the protocouch but as far as the third whork. of densely crowded, minute pits, apparently arranged in obliquely I have not observed these pits beyond descending spirals the third whorl in any specimen to which I have had access Mollendorff records specimens from Sum measuring 168 min in dirmeter, thus considerably exceeding the type

Var. hariola, Benson

Helix hariola, Benson, A. M. N. H. ser. 2, xviii, 1856, p. 251.

Pfeisfer, Novit. Conch. ser. 1, 1, 1800, p. 134, pl. 36, figs. 21, 22. Blanford, J A. S B xxxiv, 1805, p 93, Hanley & Theobald, Conch Ind 1870, pl 11, fig 6

Helix (Planumra) camitum, var. hariola, Nevill, Hand List, i. 1878.

Helix (Patula (Trochomorpha)) capitium, var hariola, Tryon, Man

Conch ser 2, 11, 1887, p 74, pl 14, fig 100

Melur (Ganecella) harrola, Godwin-Austen, P Z S 1888, p 242 (+var carinata as of Blanford), Tapparone Canefri, Ann Mus-Civ Genova, ser 2, vii, 1889, p 328 Ganesella camitum, var hariola, Pilsbry, Man Conch ser 2, 1x,

1604, p 170

Helix (Ganosella) harrola, von Martens, Arch Naturg Ixv. 1, 1899,

Hab Burma: Thyet Myo (Theobald); Prome (Anderson), Puppa Hill, near Pagan (Blanford), Khagan and Hlindet (Smatt); Prome (Fea), Pyinthia near Mandalay (Nothing); Northern Chin Hills (Watson, specimens Brit Mus.)

This form resembles G capitalm in colouring and marking and appears to be distinguished purely by ite rounded periphery Its claim to varietal rank is even questionable, since connecting links occur Blanford collected at Pappa Hill an intermediate form between the carnate stage and typical hariola, while von Martens states that Nothing brought home from Pyinthia, a place 28 miles from Mandalay, three specimens, one of which was distinctly keeled, the second angulated, and the third with completely rounded periphery Godwin-Austen in his paper on Spratt's shells states that two specimens were collected, one like the type and the other keeled, which he called var carinata of W. T. Blanford's collection I am not aware that Blanford ever published this varietal name and it may be assumed that this form 18 typical capitium Nevill in his Hand List records specimens from South India taken by Stoliczka. Although this naturalist was admittedly careful I cannot help thinking that some error must have crept in, and until confirmed by other collectors I think it advisable to discard this record

170. Ganesella galea, Benson

Helin galea, Benson, A. M. N. II ser 3, 111, 1859, p. 388, Hanley & Theobald, Conch. Ind. 1870, pl. 54, fig. 7
Nanna (Sesara) galea, Nevill, Hand List, i, 1878, p. 53
Trochomorpha (Nigritella) galea, Pfeiffer & Clessin, Nomencl. Helic.

Viv 1881, p. 82.

Helix (Patula (Trochomorpha)) galea, Tryon, Man Conch ser 2. m. 1887, p 75, pl 14, hg 4

Ganesella galea, Pilsbry, Man Conch ser. 2, ix. 1895, p 170

Original description -" Testa vix perforata, conica, trochiformi, oblique striatula, striis confertissimis spiralibus granulosis decussata. albida (decorticata), spira regulariter conica, apice acutiusculo. sutura impressiuscula, submarginata; anfractibus 7, superioribus convexiusculis, tum planulatis, ultimo non descendente, acute carinato, subtus planulato, prope carinam leviter excavato, apertura valde obliqua, transversa, anguste angulari-lunata, peristomatis margine superiori recto, basali arcuato, intus incrassato, columellari superne reflexiusculo perforationem subtegente"

"Diam. maj. vix 9, min 8, axis 5½ mill" (Benson)

Hab India Teria Ghat (Theobald), Naga and Khasi Hills

(Godwin-Austen, W. Roberts)

The systematic position of this species is somewhat uncertain Nevill referred it to Sesara, a genus with which it does not seem to have any affinity. Pfeiffer and Clessin included it in Trochomorpha, which appears equally wide of the mark Pilsbry, with his usual acumen, in placing it in Ganesella, has shown a truer appreciation of its relationship as far as shellcharacters enable us to judge Nevertheless the microscopic, but distinctly strong, decussation of the upper side is somewhat abnormal in the genus, but until an examination of the animal shall prove the contrary I consider it advisable to retain the species in Ganesella. The only specimen I have seen is in the Theobald collection and agrees well with Benson's description, except that the last whorl is shortly and abruptly deflected in front Like the type this shell is much decorticated, and it is probably one of the original lot

Subfamily HELICINÆ

Genus EULOTA, Hartmann

Eulota, Hartmann, Eid- und Sussw Gastr Schweit, 1842, p 179, Mdllendorff, Nachi Blatt D Malak Ges xxiv, 1892, p 87, Pilabry, Man Conch ser 2, ix, 1895, pp 200, 202, pl. 65, figs 1-6, pl 66, figs 18-24 (anatomy)

Tipe, Heliv fruttoum, Muller

Range Asia Central Europe (one species) "Shell globose-conoid or globose-depressed, umbilicated, rather EULOTA. 199

thin, the surface smoothisli, generally with minute spiral strix, colour varying from sub-translucent white to light brown or yellowish, often with a supra-peripheral band (rarely several bands). Whorls 5-6, convex, the last hardly descending in front. Aperture round-lunate, toothless, peristome thickened within and expanded, dilated at columnlar insertion.

"Jaw arched, with 4-11 ribs denticulating the concave margin "Radula of E fruticum having the median cusp of middle teeth as long as basal plate, side cusps subobsolete Laterals with longer mesocones Marginals with long bill inner and

on the outer ones bifid outer cusps.

"Genitalia penis short, swollen, passing into a long epiphallus which receives vas deferens and retractor, but lacks flagellum. Dart sack globose, containing a round, conical dart, and communicating at base with an empty accessory sack which bears the mucus glands, these consist of 2-1 oval glands, closely bound together, and flattened on their adjacent sides, their ducts uniting into one canal which opens into the accessory sack. Duct of spermatheca long, inserted high on vagina

"Eulota is here used for a considerable number of oriental snails having essentially the organisation of the European E fruticum The penis lacks flagellium; the dart sack generally bears an accessory empty sack into which the many- or fewlobed mucus gland empties; and the dart is round in section or but little flattened, the shell being globose with considal,

though low, spire " (Pilsbry)

171. Eulota bolus, Benson

IIchx bolus, Benson, A M N II (2) xviii, 1856, p 252, Theobald, J A S B xxvi, 1857, p 242, Blanford, op cit xxxiv, 1865, p 89, Hunley & Theobald, Conch Ind 1870, pl 53, fig 7
IIchi (Dorcasia) bolus, von Martens, Die Heliceen, ed. 2, 1860, p 107, Nevill, J A. S B xlvi, 1877, p 22, ibid in Anderson, Zool Res Two Exped West. Yunnan, i, 1878, p 881, Tapparone Canefri, Ann Mus Civ Genova, ser 2, vii, 1889, p 327, Tryon, Man Conch ser 2, iii, 1887, pl 48, fig 77
IIchx (Planispii a) bolus, Nevill, Hand List, 1, 1878, p 80

Original description — "Testa auguste umbilicata, globosa, tenuis, oblique striatula, striis minutissimis confertissimis spiralibus sub lente sculpta, intidula, translucens, pallide cornea, interdum fascia unica rufa supra peripheriam ornata; spira conoidea, apice obtusiuscula, sutura leviter impressa, anfr 5 convexiusculi, ultimus non descendens, inflatus; apertura vix obliqua, rotundatolunaris, peristomate tenue, expansiusculum, albidum, margine columellari latiore, superne umbilicum semitegente

"Diam maj 14-151, min. 12-14, alt 101-111 mill Apert

majoris 9 mill longa, 8 lata" (Benson.)

Hab. Burma Prome (Theobald, Fea), Thyet Myo (Stoliczka), Pagan (Anderson) China. Ponsee and Sanda, Yunnan (Anderson)

172 Eulota cestus, Benson

Helix cestus, Benson, J. A. S. B. v, 1836, p. 353, ibid, A. M. N. Il ser 2, ii, 1848, p. 162, Reeve, Conch. Icon. vii, 1852, pl. 125, fig. 751, Pfeisfer, Conch. Cab., Helix, i., 1853, p. 339, pl. 60, figs. 19, 20, Mabille & Lemesle, Journ. Conchyl. 1866, p. 127, Hanley & Theobald, Conch. Ind. 1870, pl. 29, fig. 7

Helix (Dorcasia) cestus, von Maitens, Die Heliceen, ed. 2, 1860, p. 107

Helix (Trachea) cestus, Godwin-Austen, J. A. S. B. xlv, 1876, p. 312

Helix (Planispina) cestus, Nevill, Hand List, i., 1878, p. 80

Helix (Helicella (Dorcusia)) cestus, Tryon, Man. Conch. ser 2, iii, 1887, p. 206, pl. 47, figs. 31, 32

Eulota (s. s.) cestus, Pilsbry, Man. Conch. ser 2, ix, 1895, p. 204

Original description, amended —"Testa perforata, subdepressoconoidea, fuscescente-cornea, subplicato-striata, supra angulum
castaneo-unizonata; spira subconoidea, apice obtusato; anfractibus 5, leviter convexis, supra planulata, ultimi peripheria
angulata, basi convexiuscula, apertura obliqua, depressa, minime
transversa (altitudine latitudinem æquante), rotundato-lunari,
superne labro-antrorsum arcuato, expansiusculo, margine columellari basalique reflexis illo dilatato, perforationem semitegente

"The greater narrowness of the perforation which is nearly concealed by the reflected columellar lip, the more obtuse apex, more planulate whorls, less convex base, the oblique, sinuous, and less transverse depressed aperture and the more angular periphery, servé, independently of colour, to distinguish *H cestus* from any of the varieties of *H'similaris*" (Benson 1848)

Major diam 13 25-16 5, min. 11 5-15 25 mm, alt 8 75-

12 mm.

Hab India Sylhet, Assam (Mainwaring, my collection), Duriang Plains, Dafia Hills, Assam (Godwin-Austen) Cambodia

Moth-Kasa (Mabille & Lemesle).

Pfeiffer originally considered H cestus to be synonymous with H similaris (Mon Helic Viv 1, 1848, p 336), but subsequently modified his opinion, stating that he had been misled by specimens received under that name from China and which proved to pertain to H similaris (op. cit 11, 1853, p 228). Tryon also thought it was perhaps only a variety of that species Eulota cestus appears to me quite distinct, however, as it can readily be separated from the numerous forms of E similaris by several characters, as pointed out by Benson in his amended description. The species, in fact, rather resembles Planispira shanica in shape and contour, but it is not plicate, the umbilicus is narrower, the peristome more expanded and the columellar lip more reflected

173 Eulota similaris, Férussac.

Helix (Helicella) similaris, Férussac, Tabl Syst Limaçons, 1822. no 262 (+α unicolor, β sonulata) (nom nud)

201 EULOTA.

Helix (Helicogena) similaris, Férussec, Ilist Nat. Moll livr. xv, 1822, pl. 25 B, fig 1 (var a), fig 4 (var β), live xxiii, 1832, pl 27 A. figs 1-3 (var)

Helex similarie, Deshayes in Terussic, Hist Nat Moll i, 1850, p 171; Blanford, J A S B vxviv, 1865, p 88, Hanley & Theobald, Conch Ind 1870, pl 53, fig 1

Relix (Indicicola) similarie, Albers, Die Heliceen, 1850, p 70.

Collett, J A S B Cevlon Branch, xv, 1904, p 12

Heli (Dorcasia) similaris, von Martens, Die Heliceen, ed 2, 1800, p 107, Nevill in Anderson, Zool Res Two Exped West.

Yunnan, 1, 1878, p 880, Tapparone Caneiri, Ann Mus Civ Genova, ser 2, vii, 1889, p 320

Helix (Planispira) similaris, Novill, Hand List, 1, 1878, p 79

Helix (Fruticicola (Dorcasia)) similaris, Tryon, Man Conch ser 2, m, 1887, p 205, pl 46, figs 27-30

Fruticicala similaris, Jousseaume, Mim Soc Zool Trance, vii, 1894.

p 285

Eulota (8 s) similaris, Pilsbry, Man Conch ser 2, ix, 1895, p 205 Melix (Helicogena) addita, Perusane, Tabl Svat Limaçons, 1822, p 71 (67), no 38 bis; ibid, Hist Nat Moll live xv, 1822, pl 25 n, figs 2, 3

Helix translucens, King, Zool Journ v, 1830, p 339

Helix woodiana, Lea, Trans Philos Soc Philadelphia, v, 1837,

p 57, pl 19, fig 60

Helix epirantha, Pfeisier, Zeits Malak vii, 1850, p 70, ibid,
Conch-Cab, Helix, iii, 1854, p 349, pl 134, figs 13-15

Original description .- "H. testa sub presso-globosa, minute striata, diaphana, pallide cornea, unicolore vel rufo-unizonata; spira magis minusie elata; anfractibus consexiusculis, ultimo basi convexo, perforata : apertura rotundato-lunari : peristomate albo, reflexo, margine columellari subdilatato.

"Diam. maj 16, min. 14, alt. 12 mm." (Deshayes)

Hab India Bengal (Reeve) Burma Prome, Pagan, and Bahmo Sanda (Anderson), Beeling (Stolical a), Thyet Myo (Tapparone) Ceylon. Navalapitiya (Simon), Ambagamuwa (Collett)

No other land molluse has so wide a geographic range as Eulota similaris It is probably indigenous in Central and Southern China, Burma, Cochin China, Siam, the Malay Peninsula and Singapore, Java, Celebes, Timor, and the Philippine Islands, but, "by the unconscious intervention of commerce it has become colonized," as Prof Pilsbry remarks, in Japan, Formosa, Hongkong; Bengal, Ascension, Rodriguez, Reunion (Bourbon), Mauritius, the Seychelles, the Comoros, Madagascar, and Natal; New South Wales, the Sandwich Islands; Bermuda, Cuba, and Barbados; Brazil and Argentina Deshayes was, I believe, the first to draw attention to its wide distribution when he questioned if there was another instance of a terrestrial molluse occurring in so many remote habitats, adding that it would be of great interest to examine the animals from the various localities, so as to make sure that they belonged to the same species. It has long been considered that it owed its wide

range to its having been distributed with coffee plants, but this theory has recently been called in question — Prof. Pilsbry thinks that it has followed the cultivation of sugar-cane, and this appears to be a rather plausible theory, seeing that in many places it is commonly found on the borders of cane-fields

The bibliography of Eulota similaris is very voluminous and I have confined myself to the essential portion of it with reference to the geographical limits of this work. A number of varieties have been established, but these have also been disregarded as they likewise are outside the scope of the Fauna of British India Deshayes included under the synonymy of similaris, Helix cestus, Benson, but in this I do not consider he was justified, since the latter appears to me quite distinct, as already stated when dealing with that species

174. Eulota extrusa, Tapparone.

Helix similaris, var, Hanley & Theobald, Conch. Ind. 1870, pl 53, fig 2

Helix (Dorcasia) extrusa, Tapparone Canefri, Ann Mus Civ Genova, ser 2, vii, 1889, p 326

Hichx (Eulota) evtrusa, Pilsbry, Man Conch ser 2, viii, 1893, p 218, pl 54, fig. 100

Eulota (s s) extrusa, Pilsbry, op cit. ix, 1895, p 204

Original description.—"II. testa anguste umbilicata, subglobosa, corneo-alba, pellucida, per longitudinem oblique striata, lineis tenuissimis appressis sub lente conspicuis, basi precipue spiraliter exarata, spira conoidea, parum elevata, apice obtusiusculo Anfractibus 5, regulariter accrescentes, convexiusculi, sutura impressa, subirregulari sejuncti, ultimus magnus, subglobosus, antice vix descendens, ad peripheriam interdum perobscure subangulatus. Apertura rotundato-lunata, parum obliqua, peristoma simplex, acutum, basi subreflexum, marginibus remotis; columellari dilatato, reflexo, umbilici mediam partem obtegente

"Diam maj. 15, min 13, alt. 10 a 11 mill." (Tapparone)
Hab Burma Katha, Upper Irrawaddy (Fea)

175 Eulota zoroaster, Theobald.

Helix zoi oastei, Theobald, J. A. S. B. xxviii, 1859, p. 306, Blanford, op cit xxxiv, 1865, p. 88, Hauley & Theobald, Conch. Ind. 1874, pl. 86, figs. 2, 3 (var concolor).

Helix (Dorcasia) zoi oastei, Nevill in Anderson, Zool. Res. Two Exped West Yunnan, 1, 1878, p. 881

Helix (Planispira) zoi oastei, Nevill, Hand List, 1, 1878, p. 79

Helix (Helicella (Dorcasia)) zoi oaster, Tryon, Man Conch ser. 2, 11, 1887, p. 211, pl. 48, fig. 93

Eulota (s. 8) zoroastei, Pilsbry, Man. Conch. ser. 2, 1x, 1895, p. 205

Original description: —" Testa umbilicata, depresso-globosa, minute striata, cornea, ad peripheriam rufo umfasciata (interdum

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non cincta, pallide cornea sive vitrea) Anfract 5 Apertura parum obliqua, rotundato lunari Perist tenui, reflexiusculo

"Diam 0 62 [=16 mm]; alt 0 34 [=9 mm]" (Theobald)

Hab Burma Banks of Irrawaddy, between Ava and Prome
(Theobald); Prome, Thyet Myo, Tsagain, Pagan, Manwyne
(Anderson, Blanford)

176 Eulota schanorum, Mollendorff

Eulota schanorum, Mollendorff, Nachr Blatt D. Malak Ges xxxi, 1899, p. 105

Original description — "T anguste et semiobtecte umbilicata, conoideo globosa aut globoso-conoidea, solidula, leviter striata, spiraliter minute lineata, pallide luteo-cornea Spira plus minusve conoidea Anfr 51—6 modice convexi, ultimus supra medium obtuse subangulatus, antice breviter descendens, circa umbilicum sat distincte angulatus. Apertura modice obliqua, subcircularis, sat excisa, peristoma modice expansum, intus sublabiatum, margo columellaris superne valde dilatatus, umbilicum medium obtegens.

"Diam 245, alt. 18, apert. lat 15, long. 13.5, alt 12 mm
", 215, ", 23, ", ", 135, ", 12, ", 1025 mm."
(Möllendorff)

Hab Burma Shan States (Hungerford), Kalow, S Shan States (Strubell)



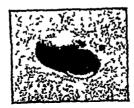




Fig 82 - Eulota schanorum

I have not seen the species but Dr Fritz Haas of Frankfort a/M has been good enough to supply me with photographs of the type, in the Senckenbergisches Museum, from which the accompanying illustrations have been reproduced

177 Eulota scalpturita, Benson

Helix scalpturita (Benson), Theobald, J A S B xx1, 1857, p 248 (noin nud), Benson, A M N H ser 3, 111, 1859, p 391, Blanford, J A S B xx1v, 1865, p 88, Hanley & Theobald, Conch Ind 1870, pl 53, fig 9

Helix (Planispua) sculpturita Nevill, Hand List, 1, 1878, p 79

Godwin-Austen, P Z S 1888, p 242

Helix (Acusta (Fruticicola)) scalpturita, Pfeisser & Clessin, Nomenci Helic Viv 1881, p 119

Helix (Helicella (Dorcasia)) scalpturita, Tryon, Man Conch ser 2, in, 1887, p 211, pl 48, fig 94

Helix (Dorcasia) scalpturita, Nevill in Anderson, Zool Res 'I wo Exped West Yunnan, 1, 1878, p. 881, Tapparone Canefri, Ann

Mus Civ Genova, ser 2, vii, 1889, p 51

Eulota (s s) scalpturita, Pilsbry, Man Conch sei 2, ix, 1895,

р 205.

Original description — "Testa umbilicata, globoso-depressa, striatula, confertim spiraliter acuducto-striata, nitidiuscula, albida, versus apicem et antice pallide rufescente, aliquando unifasciata, spira conoidea, apice obtuso, sutura impressa; anfractibus 5½ sensim accrescentibus, convexiusculis, ultimo rotundato, antice parum breviter descendente; apertura obliqua, rotundato-lunata, peristomate tenui, expansiusculo, margine columellari dilatato-expanso, umbilicum angustum profundum partim celante"

"Diam maj. 22, min. 19, axis 14 mill"

"Var depressior: Diam maj. 20½, min 18, axis 11 mill." (Benson)

Hab Burma Ava (Oldham), Tsagain, Ava, and Mandalay (Blanford, Anderson); Mandalay (Fea); Shan Hills (Godwin-

Austen); Thyet Myo or Prome (Theobald)

Benson, in describing the species, states that "independently of size, colour and greater solidity, there would be little to distinguish this shell from the true H similaris, Fér, were it not for its peculiar sculpture." The comparison, to my mind, is not a happy one as scalpturita, apart from its sculpture, has a totally different contour. Benson also refers to a still more-depressed, and smaller, variety than that of which the measurement is given, found by Mr. Theobald at Thyet Myo or Prome, but he gives no dimensions. I possess some specimens from Ava which measure: diam. maj 185, min. 165, axis 10 mm. On the other hand, the British Museum contains specimens, from the Upper Irrawaddy, measuring—28.24:22 mm, and some shells from Pegu without the peripheral band

178. Eulota pilidion, Benson

Heliz pilidion, Benson, A. M. N. II. ser 3, vi, 1860, p. 191, Hanley & Theobald, Couch. Ind. 1870, pl. 53, fig. 6. Heliz (Planispina) pilidion, Nevill, Hand List, 1, 1878, p. 80. Heliz (Camaena) pilidion, Pfeiffer & Clessin, Nomencl. Helic Viv. 1881, p. 191, Tapparone Canefri, Ann. Mus. Civ. Genova, ser 2, vii, 1889, p. 326 (piliodon)

Helia (Enhadra) mildion, Pilsbry, Man Conch ser 2, vi, 1890, p 114, pl 31, fig 20

Lulota (s's) pilidion, Pilsbry, op cit ix, 1895, p 204.

Original description —"Testa anguste umbilicata, subglobusoconoidea, tenuissima, lævigata, leviter striatula, striis remotiusculis elevatioribus corneo-iuscis, alteris confertissimis spiralibus decussantibus, translucente, albida, fascia unica peripherica rufa

205 TLLOTI

spira conoidea, apice obtusiusculo, sutura leviter impressa: aufractibus 41. seusum accrescentibus, convexiusculis. ultimo antice vix descendente, subtus convexo; spertura obliqua, onadrato-lunata, peristomate acuto, tenur, undique expansiusculo. moreunibus remotis, subconniscatibus, callo tenut minetis, columellari latiore trangulato-expanso"

"Diam may 16 min. 13, axis 9 mill" (Benson)

Hab Burma . Pegu (Benson), East of Moulmann (Stoliczka);

Tennsserim (Parison) Bliamo (Ica) Cambolin (Morelet)

This uppears to be a rare species. I have not seen specimens Some shells in the Theobald collection. British Mureum, were labelled H, pilidion, but upon examination they proved to be Ganevella scenoma

179 Eulota veguensis Benson

Helia pequences, Benson, A M N H Ser 3, 88, 1860, p 192; Blanford, J A S B xxxx, 1865, p 89. Hanley & Theobald. Conch. Ind. 1870, pl. 58, fig. 6

Helix (Plantepura) preguents, Nextll, Hand List, 1, 1878, p. 79

Helix (Lula dea) preguents, Prisbry, Man. Conch. ser. 2, vt, 1890,

p 113, pl 11, fiz 22

Pulota (n' n') pequenor, Pilsbry, op cit ix, 1895, p 204

Original description - Testa auguste umbilicata, globoso-depressa, solidiuscula, oblique rugoso-strutula artidiuscula, translucente, rufocornea, obscure unifasciata; spira conoidea, apice obtu-o, entura profundiuscula, rugose submarginata; unfrictibus 5, viz converis, lento accrescentibus, ultimo rotundato, supra peripheriam obtuse augulato, antice leviter descendente, circa umbilieum compressusculo, apertura obliqua, rotundato-lunari, peristomate expansiosculo, livide albido-violaceo, marginibus remotis subsonniventibus, columellari expanso, reflexiusculo, umbilicum leviter occultante

" Diam maj 20, min. 18, axis 13 mill " (Benson)

Hab Burma Sheony-Gheen, Pegu (Haughton), Thyet Myo,

Pegu (Theobald)

"The umbilious is wider in some specimens than in others, and the angle above the puriphery is variable, and occasionally more pronounced. In dead specimens the haid violaceous colour of the aperture and hip is changed into white, and the obscure fuscous band at the periphery is scarcely to be detected ' (Benson)

180 Eulota radicicola, Benson

Helis radicicola, Benson, A. M. N. II. ser 2, 11, 1848, p. 161; Reive, Conch. Icon vii, 1852, pl. 125, fig. 753; Pfeisfer, Conch. Cab., Helis, 111, 1854, p. 379, pl. 141, figs. 13, 14, Hunley & Theobald, Conch. 1nd 1874, pl. 62, fig. 10

Helix (Helicilla (Dorcana)) radicicola, Tryon, Man. Conch. ser 2, pp. 1887. p. 210, pl. 48, 48, 48, 48.

m, 1887, p 210, pl 48, ig 85

Lulota (8 a) radicicola, Pilsbry, Man Conch ser 2, 1x, 1905, p 205.

206 HELICIDA

Original description — "Testa perforata, subglobosa, tenui, virescente-cornea, translucente, subtus nitidiori, iadiato-striata, striis concentris delicatissimis decussantibus, spira elata conoidea, apice obtuso, anfractibus 4 convexis, ultimo obtuse angulato, apertura obliqua, subquadrato-rotundata, peristomate recto (acuto), margine columellari verticaliter descendente, supra late reflexo, perforationem semitegente

"Diam may 10 mm, axis 7 mill" (Benson)

Hab. India. Landour (Bacon, Benson), Mussoorie (Hutton),

Simla (Theobald), Sikkim (Beddome)

The Benson collection at Cambridge contains a tablet with six specimens, the largest of which measures diam. I15, alt. 1075 mm, the smaller ones being immature. No locality is recorded on the tablet and it is rather doubtful whether the type is one of them. A specimen in the Theobald collection of the British Museum, from Simla, is likewise not quite mature, the peristome not being quite developed. It measures 11911 mm.

Var. elatior, Martens

Henr (Arronta) elation, von Martens, Malak Blatt xv, 1868,

Helix elation, Pfeiffer, Novit Conch. ser 1, m, 1869, p 461, pl 101, figs. 4-6

Helir (Planispira) radicicola, Hutton, Nevill, Hand List, 1, 1878, p 78 (= H elation, Martens)

Helia (Fruticicola (Dorcasia)) elatior, Tryon, Man Conch sei 2, in, 1887, p 210, pl 52, figs 14-15

Eulota (s s) elatio, Pilsbry, Man Conch ser 2, ix, 1895, p 204

Original description.—" Testa subobtecte perforata, globosoconica, striatula et malleata, nitidula, pallide riridi-flavida fascies 2 pallide fuscis latis picta; spira elevata, conica acutiuscula. antr 5, convexiuscula, ultimus rotundatus, antice paulum descendens, columella recta, crassa; apertura diagonalis, truncato-ovalis; peristoma incrassatum, breviter patulum album, margine columellari paulum arcuato, supra dilatato, perforationem maxima e parte tegente

"Diam. maj. 15½, min 13, alt. 15; apert lat =alt., 8½ mill"

(von Martens)

Hab Himalaya

Dr. Thiele, the Director of the Konigl-Zool Museum, Berlin, has obligingly sent me the type of von Marten's Helix elatior for inspection, and a careful examination has convinced me that it can at the most be only regarded as a variety of E radicicola. It is certainly a larger and more solid shell than typical radicicola, the peristome is distinctly thickened and expanded, but scarcely reflexed, while the columellar margin is broadly dilated and reflexed, all ost completely closing the umbilicus, a mere shit being left, a recely large enough to admit a very fine needle. On some of the whorls very minute spirals can be detected with a

strong lens, while the last quarter of the penultimate and the whole of the last whorl is more or less regularly malleated, giving the appearance here and there of being furnished with spiral or obliquely descending ridges. The shell, moreover, is ornamented with two pale fuscous bands, one comparatively narrow, midway between the suture and periphery, the other practically covering the base of the shell from the periphery downwards, but becoming rather diffused about the umbilicus

A specimen from Sikkim, in the Beddome collection, agrees fairly well with elatior, but it is without the bands and is subangulated at the periphery except towards the mouth. It is also a trifle broader in proportion, measuring 16-5 mm. in diameter, alt. 15 mm

Genus CATHAICA, Mollendorff.

Cathaica, Mollendorff, Jahrb D Malak Ges xi, 1884, p 339 (as group of Helix), Pilsbry, Man Conch ser. 2, viii, 1893, p 204 (as section of Helix), ix, 1895, p 205 (as section of Eulota). Andreae, Mitt Roemer Mus, no 12, 1900, p 2, Mollendorff. Ann Mus Zool Acad Imp Sci St Petersburg, iv, 1899, p 101; ibid, op cit, vi (1901), 1902, p 302

Type, Helix fasciola, Drap (=pyrrhozona, Phil)

Range North and Middle China, Central Asia, Kashmir and Burma

"Testa umbilicata, depressa, strus vel costis ruditer sculpta, anfr. 5-7, convexiusculi, ultimus plerumque ad peripheriam angulatus vel carinatus, apertura obliqua, peristoma intus incrassatum margine supero plerumque recto, externo et infero plus minusve expansis, columellari dilatato" (Möllendorff.)

"Animal with the fail rounded above, no longitudinal groove

Sole indistinctly tripartite.

"Jaw arcuate, with 3 to 7 weak ribs

"Radula with blunt mesocones on median and lateral teeth,

marguals with the ectocone simple or bifid

"Genitalia. penis slender, ending in a long retractor and the terminal vas deferens. Dart sack large, opening into atrium, one dense cluster of about 10 club-shaped, glandular mucus glands inserted near its base Spermatheca duct long." (Pilsbry.)

Subgenus CAMPYLOCATHAICA, Andreae.

Campylocathaica, Andrew, Mitt Roemer Mus no 12, 1900, p 5, Möllendorff, Ann Mus Zool Acad Imp Sci St Petersburg, vi (1901), 1902, p 306

Type, Helix przewalsku, von Martens

Range Central Asia and Burma.

Shell less solid than in the subgenera Eucathaica and

Pliocathaica, frequently with translucent patches or dappled with brown. Aperture more oblique than in Eucathaica, the reflexed margin less thickened within, the tooth, characteristic of Catharea. but faintly indicated, generally only present in the smaller forms The last whorl shows an indication of an angulation at the upper portion. Frequently two brown bands are present, which occasionally are partly dissolved or interrupted (Andreae.)

181 Cathaica mataianensis. Nevill

Helia (Fiuticicola) mataianensis, Nevill, Scient Res Second Yarkand Mission, 1878, p 3, figs 7-9

Helia (Trachia) mataianensis von Martens, Mem Acad Imp Sci

St Petersburg, ser 7, xxx, no. 11, 1882, p 49

Helir (Plectotropis (Pseudiberus)) mataensis (err typ), Tryon,
Man Conch ser 2, iv, 1888, p 89, pl 12, figs 6-8

Eulota (Pseudiberus) mataranensis, Pilsbry, Man Conch ser 2, 1x, 1895, p 207

Cathaica (Pseudiberus) mataianensis, Andreae, Mitt Roemer Mus. no 12, 1900, p 5

Cathaica (Campylocathaica) mataianensis, Mollendorff, Ann Mus Zool Acad Imp Sci St Petersburg, vi (1901), 1902, p 306

Original description :—" Shell a little smaller than H plectotropis, in many respects a good deal resembling it, but of much thinner and more delicate texture; openly umbilicate, depressedly conoidal, whorls five and a half, with excavated suture and without a raised keel, in both of which respects it materially differs from the preceding [H. plectotropis], last whorls with a medium-sized keel, base convex, above sculptured irregularly, with more or less strongly developed ribs, beneath sculpture obsolete, almost smooth; white, irregularly mottled with pale horn colour, apex horn brown, aperture ovate, subangulate at periphery, almost as high as broad; peristome lightly reflexed, columella expanded

"Diam. 13 5, alt 7 mm; apert. diam. 6 75, alt 6 75 mm

Hab Kashmu: Mataian, Dras Valley, at 11,200 ft.

"Unfortunately most are quite young shells, only one or two being sufficiently full grown to show the reflexed outer lip Stoliczka describes the animal in his journal as 'uniform greenish dusky, no trace of a tail gland, the body very short, the posterior part of the foot shorter than the anterior." (Nevill)

182 Cathaica phæozona, von Martens

Helia phaeozona, von Martens, Imp Obsh Lyubi Estest Antrop Etnoghr vi, part 1, 1874, p 13, pl 1, fig 8 (shell), pl 3, fig. 30 (radula)

Helia (Fruticicola) phæozona, Nevill, Sci Res Second Yarkand Mission 1878, p 2, figs 1-3, ibid, Hand List, i, 1878, p 92, von Martens, Mém Acad Imp Sci St Petersburg, ser 7, xxx, no 11, 1882, p 11, pl 2, figs 10, 11

Helix (Helicella (Dorcasia)) phaozona, Tryon, Man Conch. ser 2.

111, 1887, p 205, pl 46, figs. 25, 26

Helix (Eulota) phaeozona, Kobelt, Rossmassler's Iconogr., Neue Folge, vi, 1893, p 75, pl. 169, fig 1037.

Eulota (Eulota) phæozona, Pilsbry, Man Conch ser 2, ix, 1895,

p 204

Helicella (Theba) phæozona, ibid, op cit 1895, p 266 Cathaica phæozona, Mollendorff, Ann Mus Zool Acad Imp Sci St. Petersburg, iv, 1899, p 126

Helix phaozona, Wiegmann, Ann Mus Zool. Acad. Imp. Sci.

St. Petersburg, v, 1900, p 131 (anatomy)

Original description .- " Testa anguste umbilicata, conoidea, semiglobosa, ruditer striata, lineis spiralibus subtilissimis confertis, alba, fascia unica latiuscula, castanea, peripherica; spira conoidea, anfractus 51, convexusculi, ultimus basi convexus, antice vix descendens, apertura parum obliqua, lunato-rotundata; peristoma leviter incrassatum, margine supero recto, basali patulo, columellari dilatato patente" (Martens.)

Diam. maj. 14-17, min 11 5-14 5, alt 8-14.5, apert lat 7-8 5,

alt 65-7 mm.

Hab. Turkistan (Fedischenko, Przewalski, Stoliczka) India

Hunza, Kashmir (Conway)

Five specimens—of which only two are adult—collected at Hunza, Kashmir, and presented to the British Museum in 1893 by Mr. W. M. Conway, I refer to von Martens's species They are smaller and more depressed than the shells figured by von Martens and Nevill, measuring 14 · 11.5 · 85 mm. respectively, but both authors state that the species varies considerably in this respect, the latter recording a depressed variety from Pasrobat, west of Yarkand, measuring diam 16, alt 145 mm.

183 Cathaica bactriana, Hutton

Var. burmanica, var. nov.

Helix bactriana, Hutton, J.A.S. B. xviii, 1849, p. 651, Reeve, Conch. Icon vii, 1854, pl. 195, fig. 1376, Hanley & Theobald, Conch. Ind. 1875, pl. 130, figs. 1, 4

Helix (Fruticicola) bactriana, Nevill, Hand List, i, 1878, p 93

Helix (Helicella (Dorcasia)) bactriana, Tryon, Man Conch ser 2, ın, 1887, p 212, pl 49, figs 13, 14 Eulota (Eulota) bactrıana, Pılsbry, Man Conch ser 2, ix, 1895,

p 204

Original description -- "Animal straw coloured, with the superior tentacula very long and black; shell carried obliquely horizontal; foot short and rather tapering posteriorly.

"Shell fuscous or pale earthy brown, but varying to reddish brown, and m some to sandy brown, in hving specimens dotted over with darker spots or blotches from the animal being apparent through it subglobose; spire obtuse, scarcely exserted; whorls 6; aperture or ate lunate, oblique, whorls obliquely and finely wrinkled 210 RELICIDE

with the stree of growth; peristome acute, pillar lip partially reflected over the umbilicus; a strong white rib within the aperture. showing usually a rufous band externally, umbilicus moderate. exposing a portion of the penultimate whorl Some have a pale line along the periphery of the body whorl, which is slightly angular.

"Diameter 6 inch [=15 mm.]. (Hutton.)

Hab. Afghanistan, Candahar (Hutton), type. Burma (Cuming

Coll.), var.

The var. burmanica differs from the type in being more depressed, more widely umbilicated, in having the periphery subangulated and the basal margin of the peristome nearly straight and obliquely ascending towards the columellar margin. The specimen in the Cuming collection of the British Museum, upon which this new variety is based, is also considerably paler than the type, but, notwithstanding, shows the peripheral pale band distinctly.

Genus PLECTOTROPIS, Martens.

Thea, Albers, Die Heliceen, 1850, p 118 (not Thea, Coleopters,

Mulsant, 1846).

Plectotropis, von Martens, Die Heliceen, ed 2, 1860, p 121, as section of Helix, Pilsbry, Man Conch ser. 2, ix, 1895, p. 203, as section of Eulota, pl. 65, figs 13, 14, pl. 66, figs 33, 34 (anatomy).

TYPE, Helix elegantissima, Pfeiffer.

Range. India, Burma, Farther India, Japan, China and adjacent

Islands, south to the Malay Archipelago.

"Shell depressed and carinated, widely umbilicated, dull and brown, with more or less shaggy cuticle and usually a peripheral fringe of hairs; whorls numerous (5 to 8), narrow and slowly increasing. Aperture small, angulate-lunar, oblique; lip narrowly expanded, reflexed below

"Jaw high-arched, with many (10-19) ribs, more or less deuticulating the basal margin.

"Radula having the middle tooth without side cusps, but with a lateral bulging, middle cusps about the length of basal plate; laterals with a small ectocone. Marginals with the long inner

cusp bifid, ectocone split into two.

"Genitalia; penis rather long, epiphallus short, strongly bent at the attachment of retractor, continued in a rather short, blunt flagellum. Dart sack large, containing a long, slightly curred dart, lens-shaped in section. Mucus gland inserted high on dart sack, divided into two glandular branches which are wide, flattened and rather incoherent, the dart sack and glands bound loosely to vagina. Duct of spermatheca very long and slender, without diverticulum, bound to oviduct" (Pilsbry.)

The species constituting the group of Plectotropis appear to me so well characterized conchologically that it is here accorded generic rank. Without in any way presuming to criticise Prof. Pilsbry's views, the conchological characters seem to be correlated with certain anatomical details In *Plectotropis* a flagellum occurs which is wanting in *Eulota* s. In the former the epiphallus is long and the duct of the spermatheca is bound to the oviduct. in the latter it is inserted high on the vagina and the epiphallus is short. In Plectotropis the jaw possesses 10-19 ribs, in Eulota it is provided with only 4-11 ribs.

184. Plectotropis huttoni, Pfeiffer.

Helix orbicula, Hutton, J. A. S. B. vii, 1838, p. 271 (non H. orbicula,

Orbigny, 1835)

Helix hutton, Pfeiffer, Symb Hist. Helic ii, 1842, p 82, ibid, Mon Helic Viv i, 1848, p 202, Reeve, Conch Icon vii, 1852, pl 129, fig 786; Blanford, J A. S B xxxiv, 1865, p 89, Hanley & Theobald, Conch Ind 1870, pl 15, fig 8, Theobald, J. A. S B, xxxix, 1870, p 35, Pfeiffer, Conch -Cab., Helix, iii, 1881, p 300, pl 146, fig. 200. 1881, p 399, pl 144, figs 9, 10

Fruticicola huttoni, Theobald, J A S B vivi, 1878, p 144

Helix (Pleclotroms) huttons, Nevill, Hand List, 1, 1878, p 73, Tryon, Man Conch ser 2, iv, 1888, p 54, pl. 11, fig 56
Eulota (Plectotropus) hutton, Pilsbry, Man. Conch. ser 2, ix, 1895,

p 209

"T. umbilicata, orbiculato-convexiuscula, subdiaphana, pallidecornea, epidernide scabra induta, anfr. 6 convexiusculi, ultimus angulatus, antice vix descendens; umbilicus latiusculus, perspectivus; apertura obliqua, lunato-rotundata; perist. simplex, marginibus conniventibus, dextro recto, basali breviter reflexo. columellari subdilatato, patente." (Pfeiffer.)

"Diam maj 10, min 9, alt 53 mill."

Hab. India Simla and Landour (Hutton, Stoliczka, Oldham); Dargeeling (Stoliczka, Mainwaring); Kashmir (Theobald), Naga Hills (Roberts); Dafia Hills (Godwin-Austen); Shevroy Hills, Burma · Upper Salween Valley (Fedden); (my collection) Puppa Hills, near Ava (Blanford). China: Ponsee, Yunnan (Anderson).

Var savadiensis, Nevill

Helix (Plectotropis) hultoni, var savadiensis, Nevill, J.A.S.B. xlvi, 1877, p. 20, ibid, Hand List, i, 1878, p. 73, ibid. in Anderson, Zool Res Two Exped West Yunnan, i, 1878, p. 879.

Diam 12 5, axis 5 25 mm

Hab Upper Burma. Sawady (Anderson)

Differs from the type by its more raised spire, stouter texture, and less open umbilious. Nevill considers the shell represented in Conch. Ind pl. 15, fig. 8, not to be a typical specimen from the North-West Himalayas, but rather a specimen from Darjeeling. The former, he states, is a smaller, more rounded, and less solid shell, scarcely keeled at the periphery, with a higher spire and

less produced aperture. The Darjeeling specimen measures. diam. 12 25, axis 5 25 mm Specimens from Darjeeling in my collection measure diam 10 5, axis 5, but they are distinctly keeled. A form found by Dr Anderson abundantly at Ponsee and Ava is said to be nearer the Darjeeling form, the spire being slightly higher, with the apex more central

A variety is recorded by Nevill (Hand List, 1, 1878, p. 74) from Great Cocos Island (Stoliczka) and Little Cocos Island (Wood-

Mason), but no characters or dimensions are mentioned

Var. radleyi, Jousseaume

Hygromia 1 adley1, Jousseaume, Mém Soc Zool France, vn, 1894, p 284, pl 4, fig 6

Helix hutton, var radley1, Sykes, Proc. Malac. Soc London, 111, 1898, p 161

Diam. 92-11, alt 4-65 mm.

Hab. Cevlon: Nuwara-Eliya (Simon), Uda Pussellawa (Collett). Scarcely separable from typical huttoni, but it appears to be smaller, more elevated in the spire, and somewhat more closely coiled. I possess specimens from Uda Pussellawa, measuring diam. 105, alt 55 mm, being intermediate, therefore, between Joussenume's and Sykes' specimens as regards elevation of spire Nevill records a variety (Hand List, 1, 1878, p. 73) from Fort McDonald, Ceylon, which is probably identical with Joussenume's variety.

185. Plectotropis oldhamı, Benson

Helix oldhami (Benson), Theobald, J. A. S. B. xxvi, 1857, p. 248 (nom nud), Benson, A. M. N. H. ser 3, 111, 1859, p. 185, Blanford, J. A. S. B. xxxiv, 1865, p. 89, Hanley & Theobald, Conch. Ind. 1870, pl. 15, fig. 7

Helix (Egista) oldhami, von Martens, Die Heliceen, ed. 2, 1860, p. 122

Helix (Plectotropis) oldhami, Nevill, Hand List, i, 1878, p. 73, ibid, in Anderson, Zool Res. Two Exped West Yunnan, 1, 1878, p. 878

Helix (Plectotropis (Egista)) oldhami, Tryon, Man. Conch. ser 2, 1, 1888, p. 61, pl. 13, fig. 25

Eulota (Plectotropis) oldhami, Pilsbry, Man Conch ser 2, ix, 1895, p 209

Original description — Testa late umbilicata, orbiculato-depressa, tenui, oblique il regulariter flexuoso-striata, cornea?, spira vix elevata, vel depressissime conoidea, apice exsertiusculo, obtuso, sutura impressa, anfractibus 6½ lente crescentibus, planulatis, ultimo autice brevitei iapide descendente, superne obtuse carinato, subtus convexo, circa umbilicum profundum perspecti um angulato; apertura obliqua, subcirculari, peristomate expansiusculo, reflexiusculo, marginibus conniventibus, approximatis."

"Diam major 13, minor 11, axis 6 mill." (Benson)

Hab. Burms: Ava (Oldham, Anderson); between Prome and Tongoop, Arakan Hills (Blanford); Pegu (Stoliczka). India

Assam (Stoliczka).

When describing the species Benson referred to *H. oculus* as its nearest ally. It is, however, much nearer to tapena, from which it may be distinguished by the wider and more open umbilicus, the slightly blunter periphery, more depressed spire, and more closely coiled whorls, for although considerably smaller in size it possesses a whorl more A third specimen on the same tablet in the Benson collection, in fact, I refer to *P. tapeina*, var alowtongensis, while measuring 16 mm in diameter, it is only composed of 5½ whorls, the last whorl is less deflected in front and a little less angulated at the periphery, although the whorls are more flattened. This variety appears to approximate still nearer to *P. oldhami*, although usually more depressed in the spire, less deflected in front, and possessing only five whorls. The latter, however, is invariably more angulated around the umbilicus than either *P. tapeina* or its variety alowtongensis.

The shell recorded by Blanford * as H. oldhami from Siam is quite distinct and belongs to Trachia, being nearer to mlagenea

186. Plectotropis nutans, Gude.

Plectotropis nutans, Gude, Proc Malac. Soc London, x1, 1914, p 55, text-figure

Original description .- "Shell depressed conoid, rather widely and perspectively umbilicated, thin, light corneous under a pale yellowish deciduous cuticle, finely and arregularly striated, very minutely spirally striated above, the base covered with much coarser, incised, slightly wavy spirals Spire low, suture linear, apex acute. Whorls 51-51, increasing slowly and regularly at first, the last rather suddenly; flattened above, the last convex below, keeled at the periphery, the keel being rather pinched above and below, angulated around the umbilious, not dilated at the mouth, very shortly and slightly descending in front Aperture oblique, subhastate, margins approaching, united by a very thin callus on the parietal wall; peristome rather thin, scarcely thickened, but distinctly expanded, slightly reflexed; upper margin slightly curved, forming an obtuse angle with the outer margin, which is also slightly curved, the basal margin strongly curved, slightly angulated at the junction with the columellar margin, which is almost straight, ascending obliquely, triangularly dilated, but not overhanging the umbilious" (Gude)

Major dam. 16-5-17, minor 14-14 5; alt 8 mm

Hab. India: Habiang, Garo Hills (Godwin-Austen); West Khasia, Assam (Beddome)

^{*} Proc. Malac. Soc London, v. 1903, p 278

In shape P. nutans somewhat resembles the var. theobaldiana of P. tapeina, but the shell is much thinner, the whorls are more flattened above and less tumid below, the keel is more pronounced and pinched and the aperture quite different. The principal character, however, separating it from P tapeina and its varieties lies in the absence of cuticular granules or squame and in the deciduous cuticle. I found specimens in Mr. Leman's collection and in the British Museum—both the Blanford and the general collection—with the MS. name Trachia nutans, Blf.





Fig 83 — Pleciotropis nutans (From Proc Malac Soc London)

The specimen in the general collection is a trifle larger, measuring 18 mm. in diameter, and more solid, while the last whorl descends for a considerable distance, but this does not seem to me to be a normal feature. Mr. Ponsonby possesses two specimens, received from Lt.-Col. Godwin-Austen, labelled "Habiang, Garo." One of these also measures 18 mm in diameter and it has the aperture more dilated and the basal and columellar margins more curved than the other specimens I have seen.

187. Plectotropis tapeina, Benson.

Helix tapena, Benson, J. A. S. B. v, 1836, p. 352, 1bid, A. M. N. H. 1x, 1842, p. 486, Reeve, Conch. Icon vii, 1852, pl. 125, fig. 760, Pfeisfer, Conch. Cab., Helix, 11, 1854, p. 334, pl. 131, figs. 14, 15, Blanford, J. A. S. B. xxxiv, 1865, p. 89, Hanley & Theobald, Conch. Ind. 1870, pl. 15, fig. 6, Nevilli in Anderson, Zool. Res. Two Exped. West. Yunnan, i, 1878, p. 876.

Helix history, ver. tapena. Godging Austra. I. A. S. B. xlv. 1876.

Helix hutton, var tapeina, Godwin-Austen, J. A. S B zlv, 1876, p 312

H-lix (Plectotropis) tapeina, Nevill, Hand List, 1, 1878, p 74,
Tapparone Canefri, Ann Mus Civ Genova, ser 2, vii, 1889,
p 324; Tryon, Man Conch ser 2, iv, 1888, p 53, pl 12,
ing 71.

Eulota (Plectotropis) tapema, Pilsbry, Man Conch ser 2, 1x, 1895, p 209

Original description —" Testa subconoidea, supra convexa, subtus tumida, epidermide minutissime corrugata; peripharia angulata, peristomate non continuo, subreflexo. Umbilico mediocri, profundo; omnes anfractus exhibente." (Benson)

"Diam. 0 6 poll. [=15 mm.]"

Silhet (Benson): Khasi Hills, Assam (Godivin-Austen. Stoliczka), Cherrapoonjee, Assam (Anderson), Harmutti, Dafia Hills (Godwin-Austen, Stoliczka) Burma: Promo (Fea)

The species varies considerably in size, specimens from Cherrapoonice, in the writer's possession, sent by a native collector. ranging from 11 5-10 5-6 to 16.5-14.75-9 5 mm A specimen in the Benson collection is abnormally high in the spire, measuring.

diam 11.5, alt 8.75 mm.

P. tapeing has been confused with P. rotatoria. v. d. Busch, a Java species, and P trichotropis, Pfr , a Chinese form. Nevill, in fact, records a variety rotatoria, Buchanan (apparently a misprint for v. d Busch), from Bhamo, Manwyne, and Shan Hills near Ars, and Assam. P rotatoria, however, is quite distinct. having more flattened whorls, a sharp keel at the periphery, and a deeper and wider umbilicus Tapparone Canefri recognised that the form recorded as var. relatoria was distinct from that species, and he separated the Burmese form, thus named, as P. theobaldiana.

Nevill recorded allowtongensis and rotatoria as doubtfully separable. thinking the differences might "be merely perhaps

incidental to individuals, and not even to local races."

In the rime paper (p 19) he refers some specimens taken by Godwin-Austen in the Khasi Hills to P. trichotropis, Pfr, stating his belief that one of them is represented by pl 15, fig. 4, of Conch. Ind

I do not think this Chinese species occurs in the Indian region. and am firmly convinced that Nevill wrongly identified his specimens. P. trichotropia, which bears no resemblance to the figure quoted, has a more trochoid spire, the whorls are more flattened above and the suture is consequently much shallower, while the whorls below are much more inflated; the keel is more pronounced and situate higher up, and is, morcover, ornamented with a fringe. a feature I have never observed in any of the Assam or Burma shells, in however fresh condition. The aperture further differs in being less dilated transversely, being in fact almost auriculate, and the columellar margin is more oblique and, being straight, it forms an obtuse angle with the basal margin. The umbilicus, too, although not wider is more open and distinctly angulated. The sculpture, finally, is also quite different in trichotropis, consisting of elongated squamm, both above and below.

Nevill further mentions a variety subcatostoma from the Naga

Hills and Bhamo t, but he gives no description.

The shell reproduced on plate 15, fig. 6, of Conch and has the last whorl descending for some distance below the periphery of the penultimate whorl Although similar forms frequently occur I do not consider this typical, the normal form having the last whorl abruptly deflexed in front.

^{*} J A S B xlv1, 1877, p 17 † Hand Last, 2, 1878, p 74

Var theobaldiana. Tapparone Canefra.

Heliz rotatoria, Theobald, J. A. S. B. xxviii, 1859, p. 318, Blanford. J A S B xxxiv, 1865, p 89, Hanley & Theobald, Conch Ind. 1870, pl 15, fig 5 (non H. rotatoria, v. d Busch)

Helir (Plectotropis) tapeina, var rotatoria (Buchanan'), Nevill,

Hand List, 1, 1878, p 74

Helia (Plectotionis) tapema, var iotatoria, Tryon, Man Conch

ser 2, 1v, 1888, p 54, pl 12, fig 77

Helix (Plectotions) theobakhana, Tapparone Canefri, Ann. Mus Civ Genova, ser 2, vii, 1889, p 324

I have already shown that the form referred to rotatoria by Theobald is quite distinct from the Java species. From typical tapema it differs in having the whorls flattened, and in the periphery being sharply keeled as far as the aperture In size it varies considerably like the type, specimens in my possession from Cherrapoonjee, received from a native collector, ranging from diam maj 11.5, mm. 105, alt 6 mm. to 17 15 85 mm.

Hab Burma. Teria Ghat (Theobald), Manwyne and Bhamo (Anderson), Shan Hills, near Ava (Blanford), Upper Irrawaddy

India Assam (Stoliczka)

Var akowtongensis. Theobald.

Helia akoutongensis, Theobald, J A S B xxvii, 1859, p 306.

Helia akoutongensis, Blanford, J A S B xxxiv, 1865, p 89,

Hanley & Theobald, Conch Ind 1870, pl 15, fig 4

Helia (Plectotropis) tapenna, var akoutongensis, Nevill, J A S B.

xlvi, 1877, p 17, ibid Anderson, Zool. Res Two Exped. West

Yunnan, 1, 1878, p 876, 1bid, Hand List, 1, 1878, p 74 Helia (Plectotropis) akonotongensis, Tryon, Man. Conch ser 2, 1v,

1888, p 57, pl 12, fig 73 Eulota (Plectotropis) ahoutongensis, Pilsbry, Man Conch. ser 2,1x, 1895, p. 209

Diam 135-145, alt. 55-625 mm

Hab. Burma Akowtong, Pegu, banks of Irrawaddy (Theobald),

Thyet Myo (Blanford), Ava and Tsagain (Anderson)

Differs from typical tapeina in being more depressed in the spire, consequently more widely umbilicated, and in the last whorl being more deflexed in front, while the peripheral keel is also more acute and the aperture more transverse The elongated granules of the periostracum, moreover, are much more pronounced and coarser.

Var. perplanata, Nevill.

Helix (Plectoti opis) perplanata, Nevill, J A S B xlvi, 1877, p 19; ibid, Hand List, i, 1878, p 73; ibid in Anderson, Zool Res Two Exped West Yunnan, i, 1878, p 878

Helix (Ægista) perplanata, Nevill, J A S B. I, 1881, p 133, pl 5, fig 21

Helia (Plectotropis) perplanata, Tryon, Man Conch ser 2, 1888, p 57, pl 13, figs 49-51.

Eulota (Plectotropis) perplanata, Pilsbry, Man Conch ser 2, ix, 1895, p 209

When first publishing the name, Nevill was undecided whether it was a distinct form, a variety of *H. trichotropis*, or of *H. tapeina* (near var. rotatoria) I have already stated my reasons for considering that neither *P trichotropis* nor *P rotatoria* occur within the limits of the Indian region, and I regard *H perplanata* simply as a form closely allied to the variety akowtongensis, from which it may be separated by the larger diameter and the more depressed spire

Var. bhamoensis. Nevill

Helix (Plectotropis) tapeina, var bhamoensis, Nevill, J. A. S. B. xlvi, 1877, p. 18, ibid, in Anderson, Zool. Res. Two Exped West. Yunnan, 1878, p. 877.

"Distinguished from typical H. tapeina by the last whorl, which is only slightly angular and not distinctly keeled, the aperture is smaller and less produced, while the columellar margin is slightly oblique and angular at the base. It is smoother and less depressed than, the var rotatoria, with squarer aperture and without the acute keel at the periphery. The raised spire and angulate (not keeled) periphery agree with those of H. phayrei; it is, however, smoother, less openly umbilicated, with more contracted aperture and less developed sculpture than that species. This variety connects H tapeina almost insensibly with H. catostoma and its varieties. Plate 15, fig. 10 of Conch. Ind. is much more like it than H arakanensis." (Nevill.)

Diam 125, axis 65 mm

Hab Burma · Bhamo (Anderson) India Naga Hills (Godwin-Austen)

I have not seen any specimen answering to Nevill's definition of this variety, and it is somewhat difficult to understand what he means when he states that it differs from tapeina "by the last whorl, which is slightly angular and not distinctly keeled," winding up with the statement that "plate 15, fig 10, of Conch Ind is much more like it than II arakanensis," seeing that the figure referred to is distinctly keeled.

Genus ÆGISTA, von Martens.

Egista (Albers), von Martens, Die Heliceen, ed 2, 1860, p 121 Egista, Pilsbry, Man Conch ser 2, ix, 1895, p 210, as section of Eulota, pl 65, fig 10 (jaw), fig 9 (radula)

Type, Helix oculus, Pfeiffer.

Range India, Burma, Farther India, Japan, China and

adjacent islands, south to the Malay Archipelago

"Shell depressed and broadly umbilicated, solid, striated; brown, unicolored or with a light peripheral band, spire low, composed of many narrow whorls, the last not keeled, descending

in front Aperture round lunar, oblique, peristome toothless, narrowly expanded, somewhat thickened within, reflexed at base,

ends converging.

"External anatomy and genitalia unknown. Jaw arcuate, with about 6 wide, low, but separated ribs. Radula showing the same characters described for *Plectotropis*, but the outer marginals have the ectocone hufid.

"Shells of this section differ from *Plectotropis* in lacking the peripheral keel and in the smoother surface, but there are some intermediate species. It has the same geographic range, extending northwards to Kiusiu Island, Japan. The jaw of the only species examined has fewer ribs than in *Plectotropis*, but this is not likely to prove a constant difference." (*Pilsbry*.)

188. Ægista phayrei, Theobald.

Heliz phayres, Theobald, J. A. S. B. xxviii, 1859, p. 306, Blanford, J. A. S. B. xxxiv, 1865, p. 90, Hanley & Theobald, Conch. Ind. 1870, pl. 15, fig. 1.

Hehr (Plectotropis) phayrei, Nevill in Anderson, Zool Res Two Exped West Yunnan, 1, 1878, p 879, Tryon, Man. Conch ser 2, 1v, 1888, p 55, pl. 12, fig 78

Helia (Camacna) phayres, Pfeiffer & Clessin, Nomencl Helic Viv. 1881, p 191

Helv (Euhadra) phayer, Pilsbry, Man Conch. ser. 2, vi, 1890, p 114, pl 32, fig 53

Eulota (Ægista) phayren, Pilsbry, op cit ix, 1895, p 210

Original description:—"Testa lenticulari, infundibuliforme-umbilicata, obtuse-carinata, lineis transversis flexuosis et confluentibus fortiter striata; anfract. 6, convexiusculis, sutura impressa, apertura obliqua, subquadrata. Perist tenui, reflexiusculo.

"Diam 0 68 [=17 mm], alt. 0 30 [=7.75 mm]" (Theobald)

Hab Burma: between Ava and Prome, banks of Irrawaddy

(Oldham).

Three specimens, from Ava, in the late Col. Beddome's collection, kindly placed at my disposal by Mr Leinan, its present owner, enable me to supplement the somewhat meagre original

description.

Shell depressed conoid, moderately but deeply umbilicated, rather solid, fuscous corneous, coarsely striated and densely covered with elongate papillæ, which coincide more or less with the striæ. Spire depressed, suture rather shallow, apex acute Whorls 5½-6, increasing slowly and regularly, flattened, the last convex below, angulated at the periphery and around the umbilicus, slightly dilated towards the mouth, not perceptibly descending or deflexed in front. Aperture oblique, ovate-circular, margins slightly approaching, united by a thin callus on the parietal wall; peristome a little thickened and shortly reflexed; upper, outer, and basal margins regularly curved, columellar margin forming a slight angle with the basal margin, obliquely

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ascending, triangularly dilated, scarcely reflexed over the umbilicus, which is funiculate and moderately wide, exhibiting the whole of the penultimate whorl, Major diam, 15-17, minor 13-5-15 mm.: alt. 7 25-9 mm

189. Ægista catostoma, Blanford.

Helix (Trachia) catostoma, Blanford, P Z S. 1869, p 447, Hanley & Theobald, Conch Ind 1870, pl 56, figs 2, 3

Helix (Plectotroms) catostoma, Nevill in Anderson, Zool Res Two Exped. West Yunnan, i. 1878, p 878, 1bid, Hand List, 1, 1878,

Helix (Plectotroms (Ægista)) catostoma, Tryon, Man. Conch. ser 2.

iv, 1888, p 62, pl. 13, figs 36, 37

Eulota (Plectotropis) catostoma, Pilsbry, Man. Couch ser 2. ix. 1895, p 209

Original description -" Testa late umbilicata, depressa, subdiscoidea, cornea, tenuis, strinta Spira depresso-convexa, sutura Anfr. 7. convexi, arcte convoluti, ultimus leviter impressa. rotundatus, circa umbilicum subcompressus, antice abrupte deflexus, valde descendens, pone aperturam subconstrictus. Apertura fere horizontalis, truncato-ovata; peristoma album, reflexum, antice et postice prope anfractum penultimatum arcuatum, marginibus subdistanter convergentibus, callo tenui junctis, umbilicus latissimus pervius." (Blanford)

Mai. diam. 16-18. mm. 14-5-16, alt 8 5-9 5 mm

Hab. India: Dihing, Khasi Hills (Godwin-Austen); Naga Hills (Chennell) Burms: Bhamo (Hungerford) China: Ponsee.

Yunnan (Anderson).

Blanford called it a peculiar form, resembling H. oldhami, but with the mouth somewhat as in H. nilagirica In contour it certainly somewhat assimilates with the former, but the mouth I consider more like that of atkinson: The last whorl suddenly and deeply descends in front, the superior margin of the peristome is sinuous in outline, projecting forward in the middle. In a specimen I received from the late Col Beddome the base of the last whorl is decidedly flattened for a short distance behind the peristome and the basal margin is accordingly almost straight, with a dentiform callus on the inner side Mr. Ponsonby possesses a similar specimen also received from Col. Beddome, and both agree well with the figure in Conch Ind in this respect as they do in size, the major diameter being only 135 mm. The junction of the basal and columellar margins forms nearly a right angle and the aperture may in fact be called subquadrate Two specimens in the British Museum, however, collected by Hungerford at Bhamo, do not possess the flattened base, nor the denticle on the basal margin of the peristome, but have the mouth gibbous behind These distinctly show spiral strice below the the peristome. periostracum, regular above and irregular below the periphery, 220 HILLOIDÆ

the peristracum itself bearing elongate papillæ One of these specimens measures 18 16.95 mm and the other 165:14.5:85 mm.

190. Ægista emensa. Godwin-Austen.

Helix (Trachia) emensus, Godwin-Austen, P Z S 1888, p 242 Eulota (Plectoti opis) emensus, Pilsbry, Man Conch ser 2, ix, 1895, p. 209

Original description:—"Shell subdiscoid, widely umbilicated; sculpture ill-defined irregular transverse struction; colour horny or pale ochraceous, spire subconoid, apex blunt; suture shallow; whorls 7, regular, flat, closely wound, the last descending







Fig 84 - Ægista emensa

suddenly, subangulate on periphery; aperture nearly circular, oblique; peristome much reflected below, the margins joined by callus on body-whorl.

"Size maj diam. 135, min 118, alt axis 48 mm." (Godwin-Austen)

Hab Burma Hlindet (Spratt).

"This species belongs to the widely distributed group in this part of India represented by H aloutongensis, oldhami, etc. This form is much smaller, and differs sufficiently from all the species I know"

The present species is allied to *P. catostoma*, but the last whorl is less deflexed in front and keeled at the periphery instead of angulated, the upper portion being slightly impressed above the keel. It further differs from that species by the umbilicus being not quite so infundibuliform and a little wider, showing more of the penultimate whorl The periostracum is papillate.

The above figures have been prepared from the type in the

British Museum.

191. Ægista clara, Godwin-Austen.

Hehr (Trachia) clarus, Godwin-Austen, P Z S 1888, p 242 Eulota (Plectotropis) clarus, Pilsbry, Man. Conch. ser. 2, ix, 1895, p 209

Original description.—" Shell subdiscoid, openly umbilicated; sculpture irregular, close transverse striation; colour white (but both specimens are bleached); spire depressedly conical, apex rounded, suture shallow, whorls 5, flat subangulate on periphery, the last slightly descending; aperture oval, very oblique, peristome thin, slightly reflected

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"Size: maj diam. 95, min. 85, alt. axis 4 mm." (Godwin-Austen)

Hab Burma: Hlindet (Spratt)

"This species belongs to the Helir hittoni group of shells, but is quite distinct, especially in the shape of the aperture"

A specimen in my collection is distinctly populate and pole







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corneous. It has a peripheral keel slightly impressed above and below and is subangulated around the wide open umbilicus. It is, moreover, a trifle larger than the type, measuring 10 mm in diameter.

The above figures have been prepared from the type in the British Museum.

192. Egista mitanensis, Godwin-Austen.

Helix (Aguta) entanersis, Godwin-Austen, A. M. N. II ver 6, 111, 1889, p. 108

Helix (Aguta) rutanensis, Pilsbry, Man Couch ser 2, viii, 1893, p 195

Bulota (Plectotropus) mitanenris, Pilebry, op cit ix, 1895, p 209

Original description:—"Shell globosely pyramidal, openly umbilicated; sculpture smooth, the shell covered with a thick epidermis, having a finely papillate structure; colour dark observeen or pale umber; spire conic, high, apex blunt, suture impressed; whorls 6, rather convex and rounded below, the list descending abruptly at the aperture; aperture circular, peristoine strong, white, with a sinuate margin above; columellar margin oblique."

"Diam may 109; min. 94; alt axis 67; body-whorl 52 mm" Hab. Burma: Mitan, under Mouleyit Range, Moulmein

(Limborg)

"Animal with dark tentacles, long and fine; body papillate near the head, pale, dusky on the upper surface, foot short behind and pointed. In some specimens the head and tentacles were jet-black, the rest of the body pale indige." (Godwin-Austen.)

193 Ægista congener, Preston.

Ansta congener, Preston, Proc Malac Soc London, x1, 1914, p 20, text-figure

Original description -" Shell differing from Helix catostoma in

its more exserted spire and much narrower umbilicus, and in the shape of the aperture, which is much more open and circular in that species " (Preston)

"Major diam. 12, min. 10 mm.; alt. 10 mm. Apert alt. 4.25,

diam. 35 mm (type)"

Hab. India . Naga Hills

"The series of this shell which I have before me varies considerably in diameter" (Preston)

The foregoing meagre description may be supplemented from

the type in the British Museum as follows --

Shell depressed trochoid, light corneous, finely and rather regularly striated, the upper side in places covered with excessively minute spiral striæ, more distinct on the lower side. Apex obtuse, spire depressed, suture deep. Whorls 6, increasing slowly and regularly, slightly convex, obscurely angulated at the periphery, somewhat flattened below and obscurely angulated around the umbilicus, last whorl dilated towards the mouth, shortly descending in front. Aperture ovate-rotundate, oblique, peristome white, slightly thickened, shortly reflexed; margins approaching, columellar slightly dilated. Umbilicus wide, perspective.

Equata mutanensis is proportionately much higher in the axis and the umbilicus, consequently, is more contracted; it has the periphery keeled and is darker in colour. The measurements of the type of Egista congener, including the peristome, are as follows—

major diam. 11, minor 10, alt. 6 mm.

194. Ægista coeni, Preston.

Egista coem, Preston, Proc Malac Soc. London, xi, 1914, p 19, text-figure.

Original description.—"Shell broadly turbinate, dark reddish brown, whorls 6, regularly increasing, not very convex, marked with closely-set, oblique growth striæ, base of shell also marked with lines of growth and very finely spirally striate; suture well marked, umbilicus wide and deep; columella whitish, diaphanous, rather broadly expanded above, obliquely descending; labrum not thickened, narrowly reflexed; aperture obliquely subcircular." (Preston)

Maj. diam 95, min 825 mm.; alt. 6 mm.

Hab. India · Naga Hills.

Genus VALLONIA, Risso.

Valloma, Risso, Hist Nat Europe mend iv, 1826, p. 101; Westerlund, Fauna Palaaret Binnenconch i, 1889, pp 2, 14; Sterki, Proc Acad Nat Sci Philadelphia, 1893, p 234 (jaw and dentition),

ıbıd, Man Conch ser 2, vin, 1893, p 247; Pılsbry, Man Conch ser 2, ıx, 1895, p 282, pl 70, fig 29 (jaw), fig 38 (radula), pl 63, figs 9, 10 (genitalia)

Lucena, Hartmann in Sturm, Deutschlands Fauna, vi, part 5, 1821,

p 40 (non Oken, 1815), Moquin-Tandon, Hist Nat. Moll. France, 11, 1856, p 110
Ampleirs, Brown, Ill Conch Great Britain, 1827, expl. pl. 41, Amplexus, ibid, ed 2, 1844, p 45

Zurama (Leach), Turton, Man 1831, p 64

Chilostoma (partim), Fitzinger, Beitr Landesk Oesterreichs, in. 1833, p 98

Circinaria (partim), Beck, Index Moll 1838, p 23 Glaphyra (partim), Albers, Die Heliceen, 1850, p. 87.

Type, Helix pulchella, Muller

Range. North America south to Texas; Japan, China, India;

Europe, Northern Africa, and Atlantic Islands

"Shell minute, openly and widely umbilicate, depressed, the spire low-convex, consisting of 3-42 whorls, color light and uniform, surface smooth or ribbed, periphery rounded; last whorl usually descending in front Aperture oblique, circular or short-oval; peristome continuous or nearly so, expanded or reflexed, often thickened within

"Foot small, short, with no pedal grooves; edge of sole somewhat crenulated; sole undivided, eve-peduncles cylindrical, not enlarged distally; tentacles short; labial lobes well developed.

"Jaw arcuate, with a slight median projection or none, sculptured with numerous (18 to 25) crowded, low riblets, denticulating

the margins

"Radula having 23 to 33 teeth in a transverse row. Median teeth decidedly narrower than laterals, tricuspid, the mesocone not hulf as long as basal plate, side cusps smaller. Laterals with large square basal plates, the mesocone extending to its edge, ectocone Marginal feeth wide and low, multicuspid

"Genitalia having the penis short, with terminal retractor, epiphallus short, bearing a flagellum Dart sack present, single, containing a straight, bladeless dart. No mucus glands. Duct

of spermatheca long, branchless" (Pilsbry.)

195 Vallonia pulchella, Muller.

Helia pulchella, Muller, Verm Terr Fluv Hist. 11, 1774, p 30, Rossmässler, Iconogr 11, 1838, fig 440, Binney, Boston Journ Nat Hist. 11, 1840, p 375, pl 9, fig 2, ibid., Terr Moll United States, 1, 1851, pl 9, figs 7-9 (anatomy), 11, 1857, pl 17, fig 1 (ahell), Lehmann, Leh Schnecken Stettins, 1873, p 90, pl 11, fig 30 (anatomy)

Helix (Amplexis) paludosus, Brown, Ill Conch 1827, pl 41, ings 76, 77.

Helix (Amplexus) pulchella, Brown, Ill Conch ed 2, 1844, p 45, pl 14, figs 76, 77

Helix (Glaphyra) pulchella, Albers, Die Heliceen, 1850, p 87.

Helix (Vallonia) mulchella, von Martens, Die Heliceen, ed 2, 1860,

p' 101, Nevill, Hand List, 1, 1878, p 75

Vallona pulchella, W G Binney, Terr Moll. United States, v, 1878, p 344, pl 17, fig 1, Theobald, J. A S B xlvn, 1878, p 144; Sterki, Proc Acad Nat. Scr Philadelphia, 1893, p 246, pl 8, figs A, G (radula), H, I, K, L (jaw), ibid, Man Conch ser 2, vin, 1893, p. 248, pl 32, figs 1-5, Pilsbry, op cit ix, 1895, p 283, pl 55, figs 31, 32

Original description —"Helix testa umbilicata, subdepressa,

alba, glabra, apertura circinnata; labro tereti, reflexo

"Testa tota alba, glabra, subpellucida, supra planiuscula, subtus aliquantum convexa Vertex testæ, dum limax eam inhabitat, luteolus. Anfractus vix quatuor, subtus unicus. Apertura fere circularis, limbo elevato, tereti, reflexo. Teste quidem striata est, at striæ microscopio tantum visibilis" (Muller.)

The above cursory description has been supplemented by Sterki in his admirable and exhaustive treatment of the genus Vallonia

as follows ---

"Moderately umbilicated, more widely for the last half whorl; convex or depressed conic above; straw colored, transparent, with fine and dense striæ which are more regular at the suture and umbilicus; smooth at the nucleus, whorls $3\frac{1}{2}$ —4, rather rapidly increasing, with a moderately deep suture, the last comparatively large, well rounded, little expanded towards the aperture, not descending in front, or slightly so at the suture. Aperture moderately oblique and inclined, forming five-sixths of a circle, peristome abruptly everted, with a strong white lip, thinner at either end."

Greater diam. 24, lesser 2; alt. 12 mm

Hab Circumboreal Europe; Northern and Eastern Asia, as far south as Kashmir; Northern Africa, the Azores and Madeira;

greater part of North America.

"The last whorl is slightly ascending or descending in front, in a good part of the specimens. Sometimes the shell is whitish, milky-opaque, in living examples; this seems to be a local variation, as all the specimens in certain places show this peculiarity. The size of the shell varies from 21 to 27 greater diam, 2.4 being the average

"Jaw rather strongly curved, with obtuse ends, no median projection on the cutting edge, which is denticulated, corresponding to the 10-20 rather sharp, longitudinal ribs, quite irregular in size, course, and distribution, but wanting at the side ends of the jaw. The radula has 65-68 transverse rows of 27 teeth, of the five laterals the fifth has a small plate and the ectodont double pointed."

There is nothing to be added to this excellent account. I have refrained from giving the complete bibliography of the species, or the whole synonymy, as this would not serve any useful

purpose

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196. Vallonia costata, Muller

Helm costata, Muller, Verm Terr Flux Hist 11, 1774, p 30, Rossmassler, Iconogr 11, 1838, fig 439, Chenu, Man Conchyl. 1, part 2, 1860, p 452, fig 3368

Helia (Amplexes) crenellus, Brown, Ill Conch 1821, pl 41, figs 78, 79.

Helii (Amplexus) crenella, ibid, ed 2, 1844, p 45, pl 14, figs 78,

Helix (Glaphyn a) costata, Albers, Die Heliceen, 1850, p 87

Helir (Vallonia) pidchella, var costata, von Martens, Die Heliceen,

ed 2, 1860, p 101, Nevill, Hand List, 1, 1878, p 75

Valloma costata, Theobald, J. A. S. B. alvii, 1878, p. 144, Sterki, Proc. Acad. Nat. Sci. Philadelphia, 1893, p. 259, pl. 8, fig. C. (radula), N. (jaw), ibid., Man. Conch. ser. 2, viii, 1893, p. 252, pl. 32, figs. 18-22, 27, pl. 33, fig. 54

Original description.—"Helix testa subdepressa, umbilicata, cinerea, spiris costatis; apertura circulari; labro albo reflexo

"Testa convexiuscula, opaca, supra fuscescens, subtus pallida. Anfractus quatuor externe costati, sive plicis transversis armati; in majori anfractu triginta numeravi; luc subtus glaber est Apertura circularis; vix duodecima peripherim pars ab anfractu opposito intersecatur, cum in antecedente fere quarta Costa, si testa lumini obvertatur, in sola apertura transparent Labrum

album, planum, reflexum" (Muller)

"Moderately umbilicated, more widely so for the last half whorl, depressed convex above, or nearly flat; greyish to light or reddish horn colored, with rather regularly set membranous ribs and finer strike between them; nucleus with fine revolving lines. Whorls 3½, slightly flattened above and below the periphery, at the circumference somewhat angular, with a deep suture, rather rapidly increasing, the last whorl expanding to the aperture shortly and moderately descending in front, more so at the suture than on the back. Aperture rather oblique and inclined, almost circular, a little flattened above, ends of margin much approximating, slightly protracted and auricled, connected by a thin callus; peristome strongly and abruptly everted, with a strong white lip"

Greater diam. 25, lesser 21, alt. 11 mm.

Hab Circumboreal Europe, Northern and Eastern Asia, as far south as Kashmir, Northern Africa; greater part of North America

"Jaw rather curved Radula with 69-72 transverse rows of 27 or 29 teeth; 5 perfect laterals, on which the cusps are comparatively small, especially the ectodonts. On the marginals the 6-7 cusps stand immediately on the plate, not on a common base

"V costata has, by most authors, been regarded as a variety of pulchella, but it is sufficiently different to be distinguished at first sight, the less elevated spire, with the deeper suture, the whorls not so well rounded, the last descending in front, the more oblique and more circular aperture with approximate margins, characterize

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quite a different shell, even if we omit mention of the most conspicuous feature of fresh specimens, the membranous ribs, which this species has in common with a number of other forms of this group and the next [group of V. cyclophorella]. Between each pair of these ribs are 3 to 6 finer striæ; and under the microscope very fine lines are seen, nearly parallel to the lines of growth at the suture, while on the periphery they are variously intercrossing. The nucleus, or embryonal whorls, bear a number of microscopic revolving lines in this as well as in the other species of this group.

"V. costata is rather variable. The largest measure 27, the smallest 21 mm. greater diameter. Always the sutural part of the last whorl descends more to the aperture than the back or peripheral part of the whorl, and sometimes the latter keeps exactly in the horizontal direction to the very margin of the lip. The number of ribs was found to be from 23-35 in the type. Some forms differ so much that they are to be considered varieties."

(Sterki.)

197. Vallonia ladakensis, Nevill.

Helix (Vallonia) ladacensis, Nevill, Scient Results Second Yarkand Mission, Mollusca, 1878, p 4; von Martens, Mém. Acad. Imp Sci St. Petersburg, ser 7, xxx, no. 11, 1882, p 3, pl. 3, fig. 3

Helix (Vallonia) pulchella, var. ladakensis, Nevill, Hand List, i, 1878, p 75.

Vallonia ladacensis, Sterki, Man. Conch. ser 2, viii, 1893, p 260, pl 56, figs 19-21; Mollendorff, Ann Mus Zool. Acad. Imp

Sci St. Pelersburg, iv, 1899, p 142

Original description:—"I have long separated this form, which can be distinguished from all the varieties of H. costata at a glance by its much more open umbilicus, at least half as open again; it is a much larger shell than typical H. costata, about the same size (a trifle larger) as the above described var. asiatica; the sculpture is finer, closer together, and more beautifully regular; the spire is flatter, the suture more excavated; the base is scarcely, if at all, subangulate near the umbilicus, as it is in so marked a way in the preceding; one of the best characteristics of H. ladacensis is the considerably higher and more expanded aperture with a corresponding less oblique columella; the umbilicus is so much more open that the whorls within can be clearly traced up to the apex itself." (Nevill.)

Diam $3\frac{1}{4}$, alt $1\frac{1}{2}$ mm.

Hab. India: Kashmir, Mataian, Dras Valley, Iadak (Stoliczka), Leh, Iadak (Stoliczka); Spiti, Punjab (Stoliczka) W. Tibet (Stoliczka). Turkestan: Tian-shan Mountains (Potanin). VALIONIA. 227

198. Vallonia miserrima, Gude.

Vallonia miserrima, Gude, Proc Malac. Soc. London, vii, 1907, p 307, text-figures.

Original description—"Shell widely umbilicated, depressed turbinate, greyish white, translucent, nepionic whorls smooth, the remainder finely and closely ribbed. Spire depressed, apex obtuse, suture deep Whorls nearly 4, tumid, not sloping towards the umbilicus, increasing regularly, except the last quarter whorl, which widens suddenly, descending deeply in front and dilated behind the peristome Aperture obovate, oblique; margins convergent, united by a thin callus on the parietal wall; peristome thin, slightly expanded and reflexed; margins evenly rounded,



Fig 86 - Vallonia miserrima (From Proc. Malac Soc. London)

columellar margin triangularly dilated and impinging upon the wide open umbilicus." (Gude.)

Diam. major 3, min 25 mm.

Hab. India Anamullay Hills (Beddome)

This form is allied to V. ladakensis, Nevill, but it is more excentric than that species, and the last whorl descends more deeply in front, the whorls are more tunid, the body-whorl is more compressed, the suture deeper, and the last quarter whorl is more dilated, while the umbilicus is more open and the colu-

mellar margin more dilated.

The shells from which this species was described were collected by the late Col. Beddome in the early sixties of last century in the interior of the Anamullay Hills, at an elevation of about 3000 feet. When in 1907 he handed the shells to me for description, he informed me that no European had visited the locality previously. No Vallonia had at that time been recorded so far south in Asia, and the occurrence in Southern India of a species belonging to so typically palearctic and nearctic a genus is somewhat disconcerting, especially since, in view of the fact that Beddome was the first European to visit the locality, the possibility of its introduction with plants is excluded

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Family ENIDÆ.

Genus ENA. Tuo ton

Ena (Leach MS), Turton, Manual, 1831, p 80, Gray, in Turton, Man Ed n 1840, p 181

Bulmuna, Ehrenbeig, Symb Phys Anim Evert sei 1. Moll 1831, decas prima, signature d, fourth page (non Bulimina,

D'Orbigny, 1826)

Buliminus, Beck, Index Mollusc 1839, p 68, von Martens, Die Heliceen, ed 2, 1800, p 228, Lehmann, Leb Schn Stettins, 1873, p 130. Hesse, Jahrb Deuts Malak Ges XII, 1885, p 48 (anatomy), Westerlund, Fauna Palaaret 111, 1887, p 1, von Martens, Besch Weichth Deutsch-Ost-Afrikas, 1897, p 59, Jacobi, Journ. Coll Sci. Tokyo, 111, 1898, p 76, pl. 6, figs. 118-115 (anatomy), Wiegmann, Ann Mus Zool St. Petersburg, 11, 1901, p 220 (anatomy), Beck, Jenaische Zeit Nat xlviii, 1912, p 187 (anatomy)

Type, Bulimus montanus, Draparnaud

Range Europe, Africa, Continental Asia

Shell perforate, from shortly ovate and ovate-conoid to fusiform-Aperture elongate, generally equalling a or a of the cy lindrical total height; peristome simple of thickened, straight, expanded, or reflexed, the margins usually connected by a thin callus, with or without a denticle near the upper margin, columellar margin straight

Animal (E obscura) elongate-orate, scarcely attenuated in front, almost truncate, tail elongate, pointed, greyish-yellow, with dark grey head, back, and tentacles, the latter frequently

giving off two dark stripes which run along the back

Jaw semicicular, slightly curved, with about 20 fine ribs denticulating the margins Radula leat-like anteriorly, attenuated posteriorly, bearing 50 longitudinal and 125 transverse rows of teeth. Middle tooth smaller than the laterals, with square basal plate and hooked middle cusp, which is sharp, content, simple Laterals with a pointed base and one or two short side cusps

Genitalia: the hermaphrodite gland is of the usual form, the long chain-like ovisperm duct connecting it with the uterus, from the base of which the vas deferens proceeds to the penis penis is of peculiar shape, its lower portion being attenuated towards the cloaca, and becoming dilated distally; the latter short, stout portion divides into two branches, the one proceeding upwards at a right angle, when it suddenly becomes twisted and, forming another right angle, continues in a horizontal direction, terminating in a rounded bulb, the latter receives the vas deferens The rather long retractor muscle is attached to the lower part of the vertical portion. The other branch at first proceeds in the same direction, then curves upwards at an obtuse angle, decreasing

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in size and becoming filiform, undulating, and terminating in a curved, thin, long and club-shaped flagellum. The albumen gland is elongate, lingulate, the uterus broad, strongly wrinkled, the vagina in length almost equalling the uterus. The vagina branches above the penis, but on the other side, into the spermatheca duct, which is moderately long and strong, equalling the vagina in length and terminating in the spermatheca

(Lelimann)

Jacobi, in his paper entitled "Japanische Beschalte Pulmonaten"s, when dealing with the Japanese Buliminus remanus, Kobelt—referred to the subgenus Mirus by Mollendorff—alludes to the fact that Lehmann had already drawn attention to the presence in Buliminus [Ena] obscurus of a peculiar organ—the appendix-proceeding from the penis close to the atrium. In termanus this organ is also present but possesses some special While having the same diameter and possessing equally solid walls as in obscurus, it is here only one-third its length, while at its apex, after suddenly becoming attenuated it is produced into an enormous flagellum equalling in length the whole genital apparatus and slightly swollen at the extremity. The appendix proper, near its contracted portion, is covered internally with a mucous membrane, invested with an epithelium A little below this a powerful retractor muscle is attached various considerations Jacobi comes to the astounding conclusion that this organ is homologous to a second penus. While admitting that cases of duplication of the sexual organs are unknown in Mollusca, he refers to the presence of a double penis in many snakes! A far more rational interpretation of this organ is provided by Dr Simroth, in a footnote on page 82 of Jacobi's paper, where he suggests that it is a dart sac with dart glands and retractor muscle, but without dart, as it is known to occur in Urocyclus and Parmarion

The Indian species of Ena have a somewhat remarkable distribution and those referred to the subgenera Subzebrius and Serina at least must, I think, be regarded as immigrants from the Palwarctic region; the former, numbering eighteen species, show a close affinity with Afghan, Turkestan, and Tibetan forms, while the latter, comprising only five species, are probably more nearly related to Chinese members of the group Both subgenera are confined to the north-western portion of India. The subgenus Mirus, on the other hand, has three species in Ceylon, and two occurring both in Southern India and Assam, one of the latter having also been recorded from the Shan States, while only two have been described from North-Western India. To judge from its distribution this subgenus must therefore be regarded as

endemic

^{*} Journ Coll Sci, Tokyo, xii, 1898, p 76

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None of the Indian species appears to have had its anatomy investigated and their reference to these three subgenera is, there-

fore, based purely on conchological grounds

It is somewhat surprising to find that many continental malacologists continue to use the name Buliminus for the genus in spite of the fact that as far back as 1903 Mi. B. B. Woodward had pointed out * that this name is preoccupied and that Enamust be adopted in its stead. The only exception to this, to my knowledge, appears to be Dr. J. Thiele Kobelt in 1900 and Mollendorff in 1902, indeed, have already used the name Enabut only in its restricted sense, i. e. for the group of montanus for which in 1850 Albers proposed Mei digervs

Sugenus MIRUS, Albers

Mu us, Albers, Die Heliceen, 1850, p 184 (as section of Buhmus), Adams, Gen Rec Moll 11, 1855, p. 165, Chenu, Man Conchyl. 1, 1860, p 442 (as subgenus of Chondrus), Mollendorff, Ann Mus Zool St Petersburg, 11, 1902, p 314, Kobelt & Mollendorff, Nachr Deuts Malak Ges. 1903, p 55 (as subgenus of Buhmmus).

TYPE, Bulimus cantors, Philippi.

Range Central Asia, India, China.

Shell rimately perforate, subcylindrical, or convexly-cylindrical, last whorl anteriorly slightly ascending, columella arcuate, aperture ovate, peristome expanded, callused within, the margins, united by a more or less thick callus, with or without a denticle near the upper margin.

Anatomy unknown.

199. Ena ceratina, Reeve.

Bulmus ceratinus (Benson), Reeve, Conch. Icon v, 1849, Bulmus, pl 77, fig 569, Pfeister, Mon Helic Viv in, 1853, p 352; ibid, Conch-Cab, Bulmus, 1853, p 77, pl, 21, figs 6, 7.
Bulmus (Ena) ceratinus, Pfeister, Malak Blatt ii, 1856, p 153
Bulmus cœlebs, var. ceratina, Hanley & Theobald, Conch Ind 1874, pl 80, fig 2
Bulmunus (Petracus) coelebs, var. ceratina, Nevill, Hand List, î, 1878, p 134.
Bulmuna (Ena) ceratina, Pfeister & Clessin, Nomencl Helic Viv. 1881, p 289

Original description — "Shell acuminately oblong, thin, compressly umbilicated, whorls six to seven in number, convex, somewhat obscurely irregularly striated in a grooved manner, columella broadly vertically reflected, aperture rather small, nearly orbicular, transparent horny" (Reeve.)

Long. 14, diam 7 mm. (ex rcon)

^{*} Journ Conchol x, 1903, p 358.

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Hab. India · Almorah, Kumaon, N W. Prov (Boys)

This species is allied to E. milagirica, Pfeiffer, but is considerably smaller in size with a more conoid spire and a smaller aperture. The Theobald collection compuses specimens measuring 14×55 mm and 125×625 mm., the former being marked with transverse hydrophanous streaks

200 Ena nilagirica, Pfeiffer.

Bulimus miagiricus, Pfeiffer, P Z S 1846, p 41, ibid, Mon Helic Viv ii, 1848, p 119, Reeve, Conch Icon. v, 1848, Bulimus, pl 46, fig 291 (miagaricus); Blanford, J A S B xxxv, 1866, p 38; ibid, xxxix, 1870, p 24, Theobald, tom cit p 395, Godwin-Austen, J A S B xiv, 1876, p 317

Bulimulus (Ena) milagiricus, Adams, Gen Rec Moll 11, 1855,

Bulimus (Ena) nilagiricus, Pfeisser, Malak Blatt 11, 1856, p. 153 Buliminus (Petraeus) mlagiricus, Nevill, Hand List, 1, 1878, p 135 Bulimna (Lna) mlagirica, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 291.

Buliminus (Subzibrinus) milagiricus, Kobelt, Conch-Cab, Fam

Buhminidae, 1902, p 950, pl 133, fig 5

Original description .- "Bul. testa rimato-perforata, oblongoturrita, solida, opaca, lineis impressis confertissimis subundulatis obsolete sculpta, fusca, albido oblique strigata; spira regulariter turrita, apice obtusiusculo; aufractibus 8 vix convexiusculi ultimo 1 longitudinis subæquante, basi subcompresso; apertura ovali; peristomate expanso, late albo-labiato, margine dextro superne subangulato, columellari usque ad basin dilatato. patente

"Long 28½,[9] diam 8 mm" (Pfeiffer)
Hab India Nilgiris, Anamullays (Blanford), Khasi Hills, Dafla Hills (Godwin-Austen), Shan States (Theobald), Pulney Hills (Fairbank)

Nevill, in Hand List, i, p 135, enumerates, but does not

describe, two varieties-elongata and pulneyana

The shell figured as nilagracus in Conch Ind does not pertain to Pfeiffer's species and has been separated by Kobelt as

B. hanlevanus

The length indicated by Pfeiffer in the original description-28½ mm —18 probably a misprint for 18½, since of three specimens from the Cuming collection, mounted on a tablet which bears a label in Pfeiffer's writing, two measure 195×8 mm and the third is 175 mm. long with a diameter of 6 mm marked with some transverse, whitish, diaphanous streaks and bear very close, incised, wavy spirals, two features not mentioned in the diagnosis In the Beddome collection are some shells ranging from 1625×625 to 15×6 mm

E nilagirica differs from E ceratina in having a more slender spire, and a greater number of whorls; the aperture is less dilated. and the upper and outer margins of the peristome are less curved

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201 Ena proletaria, Pfeiffer.

Bulimus proletarius, Pferster, P.Z S 1854, p 292, ibid, Mon Helic Viv. iv, 1859, p 417, Hanley & Theobald, Conch Ind 1874, pl 80, fig 3

Bulimus (Ena) proletarius, Pfeisser, Malak Blatt 11, 1856, p 153

Bulimus (Ena) proletarus, Nevill, Enum Helic Ceylon, 1871,

Bulimmus (Peti acus) proletarus, Nevill, Hand List, 1, 1878, p. 135 Bulimma (Ena) proletarus, Pfeiffer & Clessin, Nomenci Helic Viv 1881, p. 289

Ena proletaria, Jousseaume, Mém Soc Zool France, 1v, 1894, p 297

Buliminus (Ena) proletarius, Kobelt, Conch-Cab, Fam Buliminidae, 1900, p 673, pl 102, fig 16

Original description —"B testa compresse umbilicata, oblongo-turrita, solidula, sublente minutissime granulata, nitidula, corneo-fusca, spira elongata, obtusula, anfract 7, convexis, ultimo do longitudinis vix superante, antice subascendente, basi subcompresso; apertura vix obliqua, oblonga; perist albo-labiata, marginibus approximatis, dextro expanso, superne perarcuato, columellari dilatato, patente

"Long 15, diam 6 mill" (Benson)

Hab Ceylon Matelle East (Layard); Bintenne (Coll

Ponsonby)

E proletaria is allied to E nilagirica and E hanleyana, but has the whoils more turned than either, the spine is less convex and the spiral lines are a little coarser and not quite so close. The single specimen I have seen is in the Cuming collection; in all probability the type.

202 Ena hanleyana, Kobelt

Bulimus milagurous, Hanley & Theobald, Conch Ind 1870, pl 23, ing 3 (not B milagurous, Pfeister), Mollendorff coll, ex Beddome

Buliminus (Ena) hanleyanus, Kobelt, Conch-Cab, Fam Bulimindae, 1902, p 931, pl 131, figs 3-5.

Original description — "Testa ilmato-perforata, ovato-conica, solidula, sat ruditer oblique striata vel costellato-striata, obsoletissime granulata, haud nitida, sub-epidermide fusca decidua albidocornea Spira conica, lateribus vix convexiusculis, apice obtuso, lævi, nitido Anfractus 7-7½ convexiusculi, sutura impressa interinferos subcrenulata discreti, ultimus postice 2 altitudinis parum superans, basi rotundatus, subcompressus, antice ascendens. Apertura irregulariter ovata, alata, intus albido-cornea, peristoma acutum, expansum sed haud reflexum, marginibus subparallelis, distantibus, haud junctis, externo supra tantum oblique versus

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axin protracto, dein vix arcuato, basali cum columellari brevi triangulari patente, intus obsolete plicifero angulum formante

"Alt 155, diam 75, alt ap 6, lat 5 mill." (Kobelt)

Hab India Nilguis (Beddome)

This species is based upon specimens in the Mollendorff collection, received as *E milagirica* from the late Col Beddome. The figure in Conch. Ind, supposed to represent that species, and copied by Kobelt, is also referred to it. In looking through the Beddome collection, by kind permission of Mr. Leman its present owner, I found a box with several specimens labelled *milagirica*, seven of which agree with hanleyana and rauge in size between 14×7 and 12 25×7 mm. The Theobald collection also yielded two shells of this form from the *Nilgiris*, the larger measuring 15×65 and the smaller 13 75×5 mm.

E. hanleyana differs from nilagirica principally in the shorter spire and broader base, the fewer whorls, and relatively larger aperture, the umbilicus is also more open, but it agrees in being similarly provided with close incised spirals, more or less obsolete in places

203 Ena stalix, Benson

Bulimus stalix, Benson, A. M. N. II ser 3, xi, 1863, p. 322, Pfeisfer, Mon. Helic Viv. vi, 1868, p. 61, Hanley & Theobald, Conch. Ind. 1870, pl. 22, fig. 3
Bulimus (Ena) stalir, Nevill, Enum. Helic Ceylon, 1871, p. 3

Bulimus (Ena) stalix, Nevill, Enum Helic Ceylon, 1871, p 3
Buliminus (Petraeus) stalix, Nevill, Hand List, 1, 1878, p 135
Bulimina (Ena) stalix, Pfeiffer & Clessin, Nomencl Helic Viv
1881, p 289

Ena stalin, Joussesume, Mém Soc Zool France, vii, 1894,

Buliminus (Lua) stalix, Kobelt, Conch-Cab, Fam Buliminidae, 1900, p 673, pl 102, fig 15

Bulminus (Subzebrinus) stalir, Kobelt & Mollendorff, Nachr Deuts Malak Ges 1903, p 49

Original description —"B testa rimato-perforata, oblongo-conica, solidiuscula, oblique irregulariter plicatulato-striata, epidermide spiralitei confertissime striulata, castanea, strigis obliquis, sutura, basi apiceque albidis, spira elongato-conica, apice obtusiusculo, sutura impressiuscula, nonnunquam marginata; aniractibus 7, convexiusculis, ultimo ad basin compressiusculo, antice vix ascendente, apertura subobliqua, anguste pyriformi, intus castanea, peristomate sensim dilatato, vix reflexiusculo, albido, marginibus remotis, non conniventibus, columellari lato, callo obliquo superne castaneo junctis

"Long 20, diam 7 mill." (Benson.)

Hab Ceylon Upper Ourah (F. Layard), Nuwara Eliya (Simon), Borlande (Theobald), Uva, 6000 feet (coll Ponsonby)

Another form of the group of E nilaguica, but the shell is smaller than that species and the sculpture much coarser. In the

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Theobald collection is a shell taken at Borlande, Cevlon, which agrees with the figure in Conch Ind and is probably the one from which the illustration was made.

204. Ena vicaria, Blanford.

Bulimus vicarius, Blanford, J A S B xxxx, 1870, p 18, pl 3, ing 15, Theobald, tom cit p 395, Hanley & Theobald, Conch. Ind 1872, pl 22, fig 2, Pfeiffer, Mon Helic Viv viii, 1877, р 87.

Buliminus (Peti aeus) mearius. Nevill. Hand List, 1, 1878, p. 135 Bulimina (Ena) vicaria, Pfeiffei & Clessin, Nomencl Helic, Viv

Buliminus (Napaeus) vicarius, Kobelt, Conch -Cab, Fam Bulimınıdae, 1899, p 566, pl 88, figs 22, 23

Buliminus (Subzebrinus) vicarius, Kobelt & Mollendorff, Nachr.

Deuts Malak Ges 1903, p 49

Original description -" Testa profunde rimata, oblongoturrita, tenuiuscula, opaca, fulvescente-castanea, oblique striatula, lineis minutis confertissimis flexuosis subobsolete decussata, spira turrita, lateribus convexis; apice obtuso; sutura impressa Anfr 8 convexi, ultimus & longitudinis sub-æquans, basi subcompressus, antice sub-ascendens Apertura fere verticalis, truncato-ovalis; peristoma undique expansum, album, marginibus convergentibus callo tenui junctis, columellari veiticali

"Long 15, diam. 5, apert cum perist 5, longa, 4 Jala."

(Blanford)

Habiang, Garo Hills and Khasi Hills, Assam Hab India

(Godwin-Austen)

"The nearest ally to this shell is B. mlagaricus, Pfr, which, singularly enough, also occurs in the Khasi Hills, having been found by Major Godwin-Austen. The present form is distinguished by greater slenderness and smaller mouth " (Blanford.)

Its nearest ally I consider E. stalex, from which it may be distinguished by the more contracted last whorl and the very fine In the Theobald collection are two shells, one from sculpture Namı Tal, and the other from the Shan States, without precise indication of locality.

205. Ena panos, Benson.

Bulmus panos, Benson, A M N H sei. 2, xii, 1853, p 94, Pfeiffei, Mon Helic Viv iv, 1859, p 417

Bulmus (Ena) panos, Pfeiffer, Malak. Blatt, ii, 1856, p 153, Nevill, Enum Helic Ceylon, 1871, p 3

Bulmus (Patential Ceylon, 1871, p 3

Bulminus (Petræus) proletarius vai panos, Nevill, Hand List, 1,

1878, p 135 Bulimina (Ena) panos, Pfeiffer & Clessin, Nomenel Helic Viv.

1881, p 289

Ena panos, Jousseaume, Mem Soc Zool France, vii, 1894, p 297

Original description - "Testa rimata, ovato-oblonga, subrugose striata, cornea, spira elongato-conica, sutura mediocri, apice

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obtuso; anfractibus 6½ convexiusculis, ultimo 4 long, æquante, antice sub-ascendente, apertura ovata, edentula; peristomate





Fig 87 -Lua panos

expansiusculo, acuto, marginibus conniventibus, columellari breviter dilatato, albido.

"Long. 11, diam 5 mill" (Benson)

Hab Ceylon Nalande (Layard), Ceylon (Nevill)

Appears like a small form of E proletaria, but the base is not so broad as in that species I have only seen a single specimen, which is in the Theobald collection and is from Nalande, the type locality, as the species has not hitherto been illustrated I take the opportunity of giving two views of this shell

206. Ena smithei. Benson

Bulimus smither, Benson, A M N H ser 3, xx, 1865, p. 15, Pfeisfer, Mon Helic Viv vi, 1868, p 50, Hanley & Theobald, Conch Ind 1870, pl 20, fig 3

Napaus smithi, Theobald, J A S B xlvii, 1878, p 146

Nupaus smither, Theobald, op cit 1, 1881, p 48

Buliminus (Peti aeus) smithei, Nevill, Hand Last, i, 1878, p 135 Bulimina (Ena) smither, Pfeiffer & Clessin, Nomencl Helic. Viv. 1881, p 288

Buliminus (Ena) smithi, Kobelt, Conch -Cab, Fam. Buliminidae, 1900, p 682, pl 103, fig 10

Buliminus (Subzebrinus) smither, Kobelt & Mollendorff, Nachr Deuts Malak Ges 1903, p 49

Original description —" Testa perforata, ovato-oblonga, irregulariter rugoso-striata, striis tenuibus plus minusve decussata, sub epidermide cornea albida, non nitente; spira oblongo-turrita lateribus convexiusculis, apice obtusiusculo, sutura impressa; anfractibus 7½, convexiusculis, ultimo antice leviter ascendente, apertura vix obliqua, subovata, peristomate tenui reflexiusculo, marginibus callo tenui junctis, columellari perforationem subtegente

"Long 13, diam 5, apert long 4, lat. 32 mill" (Benson.) Hab India Hills on right side of the river Sutles, Punjab (Smithe), Fagoo (Theobald), Naini Tal (Stoliczka); Jhilum Valley, Kashmir and Mari [Murree], Punjab (Theobald)

The present species is related to E vicaria, but it is more cylindrical in contour, with less convex spire and more contracted

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aperture, owing to the right margin of the peristome being more inflexed.

A single shell in the Theobald collection, from the N.W. Himalayas, is probably the one on which the figure in Conch. Ind. is based.

Subgenus SUBZEBRINUS, Westerland.

Subzebrunus, Westerlund, Fauna Palaarct 111, 1887, p 66 (assection of Buliminus), Mollendorff, Ann Mus Zool St Petersburg, vi, 1902, p 327 (as subgenus of Buliminus), Wiegmann, tom cit. p 241 (anatomy), Kobelt & Mollendorff, Nachr. Deuts. Malak Ges 1903, p 47.

TYPE · (first species) Bulimus er emitus, Reeve.

Range. Central Asia, India, China, Japan

Shell subcylindrical, whitish, generally transversely streaked with pale brown, margins of peristome united by a more or less strong callus, with or without a denticle near the upper margin.

Jaw aulacognathous, distinctly dilated towards the sides.

Radula with 61-89 teeth, corresponding in most species to the formula $\frac{C}{1-3 \text{ obsol}} + \frac{L}{1-3 \text{ obsol}}$, but in a few to $\frac{C+L}{1}$

Genitalia: the spermatheca duct, including the diverticulum, after separating from the ovisperm duct, which is contiguous to both, reaches far beyond the albumen gland, frequently being twice, in some cases three times, the combined length of the

albumen gland and ovisperm duct

The neck of the uterus, which in the genus usually exceeds the vagina in length, is here practically twice as long, in one case (B. melinostoma) more than three times its length B dolichostoma, in which, on the contrary, the vagina is about one-third longer than the neck of the uterus, is an exception in this respect. The penis is inoderately long, attaining only from two-thirds to three-quarters of the length of the spermatheca duct and diverti-The appendix is somewhat longer than the penis and reaches beyond the albumen gland In one species, however (B melinostoma), the appendix is about one-third shorter than the penis, agreeing in this respect with the section Pupinulius compared with the ovisperin duct, including the albumen gland, the appendix is from 11 to 21 times as long. A indimentary cecum, situate about the middle of the penis, appears as a diminu-In one species (B melinostoma) it is wanting. tive tubercle (Wregmann)

207. Ena vibex, Kuster.

Bulimus vibex (Hutton), Kuster, Conch -Cab, Bulimus, 1845, p 57, pl 17, figs 5, 6, Pferster, Mon Helic Viv 11, 1848, p 118, Reeve, Conch Icon v, 1848, Buliminus, pl 47, fig 299, Hanley & Theobald, Couch Ind 1870, pl 20, fig 5 (° var), pl 22, fig 8 (var), pl 23, fig 2

Bulimulus (Ena) uber. Adams, Gen Rec Moll 11, 1855, p 161

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Bulimus (Ena) viber, Pfeisfer, Malak Blatt. 11, 1856, p 154
Bulimum (Napaeus) viber, von Martens, Dio Heliceen, ed 2, 1860,
p 234

Buliminus (Petracus) viber, Nevill, Hand List, 1, 1878, p. 136 Buliminu (Ena) viber, Pfeisser & Clessin, Nomencl Helic Viv. 1881, p. 291

Buliminus (Lna) riber, Kobelt, Conch-Cab, Fam Buliminidae, 1900, p 653 pl 103, figs 11-13

Buliminus (Subzebrinus) vibex, Kobelt & Möllendorff, Nachr Deuts Malak Ges 1903, p 40

Original description —"B testa sinistrorsa, rimato-perforata, ovato-cylindracea, apice attenuata, tenuiuscula, oblique striata, livido-cornea, anfractibus S vix convexiusculia, angustis; sutura profunda. apertura rotundato-trigona, oblique truncata, intus flavida, peristomate sublabiato, reflexo, plumbeo, margine acuto, columellari dilatato" (Kuster.)

"Long 11, diam. medio 4½ mill, ap 3% mill longa, intus 2 lata

(Pfeiffer.)

Hab India Simla (Hutton, Stoliczka), Landour (Benson), Mus-

soorie (Nevill)

A series of twenty-seven specimens of E viber in the British Museum from Simla, received from Hutton, range in size from 12×45 mm to 11×4 mm., while a specimen in the Caming collection, without habitat, measures. length 16, diam. 55 mm



Fig 88 -Ena vilex

The shell here figured is one of a batch from Landour, acquired by purchase in 1848 by the British Museum, and measures $11.5\times3.5~\mathrm{mm}$

E viber, E lintere, E boysiana, E arciata, E nivicola, and E huttom form a rather homogeneous group in the genus, characterized by the opaque white transverse streaks on a dark corneous or fuscous ground, the sinistral convolutions, and the comparatively short stature, none of the species exceeding 20 mm in length. As regards contour, E viber and E nivicola are the two extremes of the series, the former being the most cylindrical and the latter the most ventricose in outline

208 Ena linteræ, Kobelt

Bulumnus (Napacus) linterae, Kobelt, Conch-Cab, Fam Bulimindae, 1899, p. 560, pl. 88, figs. 6, 7
Bulimnus (Subselvinus) linterae, Kobelt & Mollendorff, Nachr Deuts Malak Ges. 1903, p. 48

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Organal description - "Testa sinistrorsa, profunde rimata. cylindracea, ruditer suboblique striatula vel striato costata, griseoalba, in anfractibus superis corneo obsolete strigata, summo rufo-Spira supra conico-attenuata, apice acutiusculo fractus 9 vix convexiusculi, leniter ac regulariter crescentes, sutura impressa, inter inferos submarginata discreti, ultimus basi rotundatus, postice altitudinis 1 vix superans, antice vix ascendens. Apertura subsemicircularis, albida, peristoma album, undique expansum, acutum, tenue, tenussimo labiatum, marginibus haud junctis, columellari parum dilatato, patente, cum pariete aperturali angulum distincte formante

"Alt. 10 diam. anfr ult. 75, alt apert. 65 mm." (Kobelt)

Hab ? Northern India.

The specimens on which the species is based were sent to Dr Kobelt by the late Miss Linter as B. arcuatus, var, but the form is evidently nearer to E whee, from which it differs by its more slender, more cylindrical shape and the more distinct sculpture; the markings are also more distinct and the aperture is proportionately larger and wider The Theobald collection in the British Museum contains three specimens from Mahasu, which I refer to E. linter a: they range in size from 155×65 to 20× 8 mm.

209. Ena boysiana. Reeve

Bulmus boystanus (Benson), Reeve, Conch Icon. v, 1849, Bulmus, pl 78, fig 575, Pfeister, Mon Helic Viv in, 1853, p 432, ibid, Conch -Oab , Bulimus, 1853, p 69, pl 20, figs 9, 10 . Hanley & Theobald, Conch Ind 1872, pl 22, fig 6

Bulimus (Bulimulus) boysianus, Pfeisser, Malak Blatt 11, 1856,

p 161.

Buliminus (Peti acus) boysianus, Nevill, Hand List, 1, 1878, p 136 Bulimina (Chondrula) boysiana, Pfeister & Clessin, Nomencl. Helic Viv 1881, p 296

Bulimmus boystamus, Westerlund, Fauna Palaaict. Binnenconchyl. in, 1887, p 74, ibid, Syn Moll Extramar Reg Palæarct i, 1897, p 18

Buliminus (Chondi ulopsis) boysianus, Westerlund, Katal. Palaäret

Binnenconch 1890, p 92

Buliminus (Subzehrinus) boysianus, Kobelt & Mollendorff, Nachr Deuts Malak Ges 1903, p 47

Original description - "Shell cylindrically oblong, smistral, scarcely umbilicated, whorls eight in number, convex, rather coarsely structed, very finely plicated at the sutures, minutely decussated beneath the lens with spiral lines, horny brown, variegated with waved opake-white lines " (Reeve)

Length 19, diam 8 mm (ex rcon)

Kumaon, W. Himalayas (Boys), Nami Tal Hab

(Stoliczka, Nevill), Darjeeling (coll Ponsonby)

I have not seen specimens, the type, like so many of Benson's, has apparently gone astray. Judging from the figures the species ENA. 239

is intermediate between E arcuata and E vibea, being less convex in outline than the former, while the latter is more fusiform. The shell figured by Reeve, which must be regarded as the type, is larger than the specimens represented in Conch. Ind. and Conch. Cab, which measure only 17×7 mm.

210 Ena arcuata, Ruster

Bulimus arcuatus (Hutton), Kuster, Conch-Cab, Bulimus, 1845, p 56, pl 17, figs 1, 2, Pfeiffer, Mon Helic. Viv 11, 1848, p 118, Reeve, Conch Icon v, 1849, Bulimus, pl 67, fig 478, Hanley & Theobald, Conch Ind. 1870, pl 20, fig 2, var, fig 7 Bulimulus (Ena) arcuatus, Adams, Gen Rec Moll 11, 1855, p 160 Bulimus (Ena) arcuatus, Pfeiffer, Malak Blatt. 11, 1856, p 154 Buliminus (Napaeus) arcuatus, von Martens, Die Heliceen, ed 2, 1860, p 234

Napaus arcuatus, Theobald, J A. S B xlv11, 1878, p 145

Buliminus (Petraeus) arcuatus, Nevill, Hand List, 1, 1878, p 136

Bulimina (Ena) arcuatus, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 291

Buliminus (Ena) arcuatus, Kobelt, Conch-Cab, Fam Buliminidae, 1900, p 684, pl 103, figs 14, 15

Buliminus (Subzebrinus) arcuatus, Kobelt & Mollendorff, Nachr Deuts Malak Ges. 1903, p 47

Original description — "B testa sinistrorsa, rimata, ovatoconica, tenuiuscula, subnitida, minutissime costulato-striata,
corneo-flava, lutescenti-arcuatiui fasciata; anfractibus 7 convexiusculis, apertura oblongo-ovali, intus flava; peristomate pallidecorneo, margine sinistro arcuato, columellari breviter dilatato"
(Kuster.)

Length 15 mm, diam. 6 mm (Pfeiffer)

Hab India Himalayas (v d Busch); Mahassu, W Himalayas (Hutton); Kashmir (Theobald), Simla and Narkandi (Oldham, Stoliczka)



Fig 89 -Ena arcuata

Kobelt gives a poor copy of the figure in Conch Ind, representing E nivicola, which is supposed to be cospecific with arcuata, but which is certainly distinct. Pfeiffer and Clessin quote Pupa sylvatica, of Hutton, as a variety of arcuata, with Bulimus nivicola as a synonym. The habitat "Moulmain" given in Conch Ind, Theobald points out, is an error. Ena arcuata

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has a more convex spire than E whee, and the body-whoil is proportionately larger. From E nivicola, on the other hand, it may be distinguished by its less globose form, it is, in fact, intermediate between these two species. Although the latter has been regarded by some authors as merely a variety of arcuata, I consider them quite distinct. Of the two first-named considerable series have passed through my hand, and I have never hesitated to which form to refer them

The specimen here figured is one of three in the Cuming collection labelled "India"; it measures 13 25 × 5 mm

The name arcuata has a rather peculiar history. A tablet in the British Museum, with twenty-six specimens received from Hutton in 1856, bears on its back the following legend, apparently copied from Hutton's letter or label—"Pfeisfer mistock or natus for arcuatus Ornatus being preoccupied I changed it to sylvaticus, but the mischief is done." This accounts for the fact that Pfeisfer quotes Pupa sylvatica as a synonym. The largest of this series measures 16×7 mm and the smallest 12×5 25 mm Another shell in the British Museum, from Simla, measures 17.5×8.25 mm, while four specimens from Mukraj, Salt Range, which I also refer to the present species, are rather different from all I have seen, being of a chalky white, with pale corneous transverse streaks, these range in size between 18×7.5 mm and 16×6.25 mm

211. Ena nivicola, Reeve.

Bulimus nivicola (Benson), Reeve, Conch. Icon. v, 1849, Bulimus, pl. 69, fig. 496, Hanley & Theobald, Conch. Ind. 1870, pl. 22, fig. 9

Bulimma (Ena) arcuata, var. sylvatica (=nivicola), Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 291

Original description — "Shell cylindrically ovate, stout, ventricose, sinistral compressly umbilicated, whorls seven in number, convex, obliquely striated, somewhat obscurely crenulated at the sutures, columella rather broad, appressed, aperture small, hip slightly expanded, red-brown, marked here and there with irregularly interrupted oblique white streaks, covered with a thin yellowish epidermis" (Reeve)

Length 11, diam 575 mm (ex icon)

Hab India Liti Pass, W Himalayas, 14,000 feet (Hutton)

"Mr Benson is of opinion that this species, distinguished by its stout cylindrical form and reversed growth, which has been upwards of twelve years in his collection, is the *Pupa sylvatica* of Hutton, described in M'Clelland's Journal for January 1841, as being found among juniper bushes at Burrenda Pass, and of which the name is preoccupied in the present genus to which this species strictly belongs It is remarkable for its stout cylindrical form and reversed growth" (*Reeve*)

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After some considerable search I have succeeded in tracing Hutton's name Pupa sylvatica, referred to by Reeve when describing and illustrating Ena nivicola, and by Pfeisier*, both on the authority of Benson, neither having seen the original. The complete reference is as follows—Cilcutta Journal of Natural History (Edited by McClelland), 1, 1841, p 479. No question of priority, however, is involved, since no description is given by Hutton, but on account of Reeve's misleading statement—"Pupa sylvatica of Hutton, 'described' in M'Clelland's Journal for January 1841"—I have thought it useful to place this fact or record

ENA



Fig 90 -Ena nimcola

E nivicola is the most ventricose member of the group. The British Museum possesses six specimens received from Hutton and labelled "Snowy Range". Some of these exceed the type in their dimensions, ranging in size from 11.5×6.5 mm to 12×6 and 14×7 mm.

The shell here figured is one of six from the Snowy Range received by the British Museum from Hutton in 1856.

212 Ena huttoni, Pfeiffer.

Bulmus cylindricus (Hutton), Kuster, Conch -Cab, Bulmus, 1845 explanation of plate on cover, pl 17, figs 3, 4 (not Bulmus cylindricus, Gray, 1825, not Bulmus cylindricus, Menke, 1830)

Bulimus huttoni, Pfeiffer, Symb Hist Helic. in, 1846, p 55, nom mut, ibid, Mon Helic Viv ii 1848, p 118; Kuster, Conch-Cab. Bulimus, 1853, p 57

Cab, Bulmus, 1853, p 57
Bulmus (Ena) huttoni, Pfeisser, Malak Blätt 11, 1856, p 154.
Bulminus (Subzebrinus) huttoni, Kobelt & Möllendorff, Nachr.
Deuts Malak Ges 1903, p 48

Original description —"T. sinistrorsa, rimato-perforata, oblongo-conica, oblique ruguloso-striata, cornea; spira oblonga, apice attenuata, obtusiuscula, anfr. 7 convexiusculi, ultimus ¾ longitudinis subæquans, columella arcuata, apertura ovalis, intus fulvescens; perist vix sublabiatum, margine exteriore vix expansiusculo, flexiosa, columellari dilatato, reflexo

"Long 15, diam 6 mill Ap 6 mill longa, 3 lata." (Pfeiffer)
Hab India

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Intermediate between E. vibex and E arcuata, being more convex in the spire than the former and more cylindrical than the latter.

213 Ena eous. Reeve.

Bulimus cous, Reeve, Conch Icon, v. 1850, Bulimus, pl 86*. ing 640: Pfeiffer, Mon Helic Viv in, 1853, p. 361

Bulimma (Petraeus) coa, Pfeiffer & Clessin, Nomencl Helic Viv. 1881, p 287

Buliminus (?) eous, Kobelt, Conch-Cab, Fam Buliminidae. 1902. p 951, pl. 133, fig. 6

Original description -" Shell cylindrically oblong, rather stout, compressly umbilicated, whorls six in number, convexly flattened, columella vertical, broadly dilated, aperture nearly orbicular, produced, margins joined together by a lamina, white" (Reeve)

Long. 28, diam 13 mm (ex icon)

Hab India (Griffiths)

Said by Reeve to be allied to B. griffith, but the figure does not exhibit much resemblance to that species, being much shorter in the spire and having a much less dilated aperture. I have not seen specimens, having failed in tracing the type

214. Ena kunawurensis, Reeve.

Bulimus kunawurensis (Hutton), Reeve, Conch Icon. v 1849, Bulimus, pl 62, fig 426, Pfeiffer, Mon Helic Viv in 1853, p 349, ibid, Conch -Cab, Bulimus, 1853, p 68, pl 20, figs 3, 4, Hanley & Theobald, Conch Ind 1870, pl 19, fig 3 Bulimulus (Ena) kunawurensis, Adams, Gen Rec Moll 11, 1855,

Bulimus (Ena) Linawurensis, Pfeiffer, Malak Blatt 11, 1856, p 154. Buliminus (Petraeus) kunawurensis, Nevill, Hand List, 1, 1878,

Bulimina (Zebrina) Lunaiourensis, Pfeisser & Clessin, Nomencl

Helic Viv 1881, p 294 Buliminus kunawurensis, Westerlund, Fauna Palaarct. Binnen-conchyl in, 1887, p 73, ibid., Syn Moll Extramar Reg Palæarct i, 1897, p 12, ibid, Katal Palaarct Binnenconch 1890, р 92

Buliminus (Subzebrinus) Lunawui ensis, Kobelt & Mollendorff, Nachr Deuts Malak. Ges 1903, p 48

Original description —"Shell elongately turreted, simistral, compressly umbilicated, whorls twelve in number, smooth or obscurely roughly structed, minutely crenulated at the sutures, aperture small, hip and columella expanded, brownish horny colour, marked here and there with opake white streaks, lip snow-white within " (Reeve.)

Long 36, diam 9 mm (ex rcon). "Long 34, diam. 7½ mill. Ap 8 mill longa, intus 4 lata" (Pfeiffer.)

^{*} The text accompanying plate 86 is marked 76 owing to a printer's error

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Hab Tibet Chini, Kunawur, banks of the Sutlei (Hutton)

India Landour, W. Himalayas (Theobald)

The species varies considerably in length. The type, according to Reeve's figure, measures 36 mm, the shell illustrated by Hanley & Theobald being 31 mm long, while a specimen from Chin in the Theobald collection only reaches 27 5 mm in length. with a diameter of 75 mm. Hutton's five specimens from Kunswur, in the British Museum, range from 31 x 9 to 28 x 7 mm. Two shells in the Cuming collection are fulyous-corneous, strongly streaked transversely with greyish white.

E kunawurensis has the earlier whorls very finely spirally striated, the spirals becoming obsolete on the later whorls. From E candelaris it may be separated by its more cylindrical shape and the smaller aperture, it also has the peristome less thickened, with acute edges, and the outer margin is less curved.

A small specimen from Kunawar, received by the British Museum from Hutton, approaches E sindica in form, but that species is more tapering towards the apex.

215. Ena candelaris, Pfeiffer.

Bulimus candelaris, Pfeisfer, P Z S 1846, p 40, ibid, Mon Helic. Viv 11, 1848, p 127, Reeve, Conch Icon. v, 1849, Bulimus, pl 60, fig 408, Hanley & Theobald, Conch Ind 1872, pl. 19.

Bulimulus candelaris, Adams, Gen Rec Moli 11, 1855, p 159 Bulimulus candelaris, Adams, Gen Rec Moll 11, 1855, p 159
Bulimus (Ena) candelaris, Pfeisfer, Malak Blatt. 11, 1850, p 152
Bulimus candelaris, von Martens, Malak Blatt. 12, 1868, p 160;
Ancey, Bull Soc Malac France, 11, 1886, p 19, Westerlund,
Fauna Palaaret. Binnenconchyl 111, 1887, p 74, Ancey, Bull
Soc. Zool France, xviii, 1893, p 42, Westerlund, Syn Moll
Extramar Reg. Palæaret 1, 1897, p 12; ibid., Katal Palaäret.
Binnenconch 1890, p 92
Nupæus candelaris, Theobald, J A S B xlvii, 1878, p 144
Buliminus (Petraeus) candelaris, Nevill, Hand List, 1, 1878, p 136
Bulimina (Petraeus) candelaris, Pfeisser & Clessin, Nomencl. Helics
Viv 1881, p 288

Viv 1881, p 288

Buliminus (Napaeus) candeluris, Kobelt, Conch-Cab, Fam Buliminudae, 1899, p. 561, pl. 88, figs. 8-12; ibid, in Rossmässler, Iconogr, N. F. ix, 1899, p. 21, figs. 1604-5

Bulmmus (Subzebrinus) candelaris, Kobelt & Möllendorff, Nachr Deuts Malak Ges 1903, p 47

Original description .—" Bul testa sinistrorsa, profunde rimata. cylindracea, apice sensim attenuata, acutiusculo, suboblique striatulo, sordide albo; anfractibus 9 planiusculis, ultinio minus oblique descendente, i longitudinis vix æquante, basi subrotun dato, apertura semiovali, intus nitida, alba; peristomate albo. undique expanso, marginibus callo tenui junctis, columellari dilatato, patente

"Long 27, diam 8 mill." (Pfeiffer.) Hab India. Fort Lockhart, N.W. India (Watson); Jhilum 244 ENIDÆ.

Valley, above Kokala (Theobald); Kashmir (Atkinson), Takht-1-

Suliman (Thomson), Tinali (Stoliczka). Tibet (Pferffer).

When first described by Pfeiser its habitat was unknown. In 1859, however, he recorded Tibet (Mon. Helic Viv iv, p. 426) as its native country, without stating the source of his information Benson (A M N. H. ser. 2, xix, 1857, p 327) gave Takhti-Suliman, Kashmir, as habitat, while Theobald (J. A. S B 1878, p. 144) mentioned it as common about Mari and in various places in Kashmir, usually above 6000 feet, but occasionally lower. He further states that

"Sinistral shells are most numerous, but dextral ones also occur not rarely. My largest sinistral shell measures 35.6×9.2 and my smallest 27.7×8.7 mm. The dextral shells are smaller, ranging from 33×8.8 to 24×8.5 mm. The shells vary somewhat in a large series, in tumidity and in the attenuation of the spire, and even in the number of whorls, a remark which applies to all the species of the genus, and proves the risk of creating new species from single examples

"I do not-think that N domina, B., can be separated, as the main distinction seems to be in the texture of the shell, but in this group the texture varies from horny and subdiaphanous, in which the striped markings are conspicuous, to creamy porcellanous, in which they are more or less if not wholly obsolete. The difference too in this respect is considerable between the living and dead shells, and largely depends (unless I am much mistaken) on the conditions of climate and alimentation under which the animal lived

"A slender form is seen in places, with a thinner shell than the type, and indicating a passage to N. kunawarensis, Hutton. A typical example of this variety measures 26.5 × 8 mil"

B candelars and B. domina are, to my mind, two perfectly distinct and valid species, notwithstanding Theobald's observations to the contrary. The latter species, apart from its markings, is much more convex in outline than the former with its attenuated spire. It is, of course, possible that Theobald had not seen the true domina

The Theobald collection in the British Museum contains even smaller sinistral specimens than those referred to by Theobald, they measure 21.5×7.5 mm, and are from the Jhilum Valley above Kokala Dextral shells from the same locality are also present Theobald's Kashmir specimens range from 36×8.5 mm to 24×8.5 , both dextral and sinistral

Dr Kobelt records three shells from Northern India, in the Mollendorff collection, measuring 29 mm in length, and being slightly angulated. He observes that some shells have corneous transverse streaks on the upper whorls, a feature which I have likewise noticed in some specimens.

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216 Ena sindica. Recie

Bulirus sundicus (Benson), Reeve, Conch. Icon. v, 1848, Bulinus, pl. 47, fiz. 303. Picifier, Mon. Helic. Viv. 11, 1853, p. 355, 1bid., Conch. Cab., Bulinus, 1853, p. 71, pl. 20, figs. 23, 24. Hanley & Treobald, Conch. Ind. 1870, pl. 20, fig. 6

Bulimus (Ena) sindicus, Pfeiffe-, Malak Blatt. 11, 1856, p 153 Buliminus (Petracus) eindicus, Nevill, Hend List, 1, 1878, p 134 Napaus sirdicus, Theobald, J A S B xlvii, 1878, p 145

Bulimma (Ishrma) andien, Pf. iffer & Clessin, Nomencl Helic Viv.

1881, p 201

Bulimmus sindicus, Ancey, Bull Soc Malac France, in, 1886, p 49, Ancey, Bull Soc Zool France, xviu, 1893, p 43, Westerlund, Katal Palaaret Binnenconchyl 1890, p 92, ibid Syn Moll Extraor Reg Palaaret 1, 1897, p 11
Buleninus (Chondrulopsis) sindicus, Westerlund, Fauna Palaaret

Binnencouchyl m. 1887, p 72

Buliminus (Eng.) sindicus, Kobelt, Conch -Cab., Fam Buliminidae. 1901, p 635, pl 103, fig 17 (corrected to Subsebranus on p 1007)

Bulimmus (Subzehrmus) sindieus, Kobelt & Mollendorff, Nachr. Douts Malah Ges 1903, p 49

Original description -" Shell cylindrically elongated, broadly umbilicated, whorls nine in number, flatly convex, smooth or concentrically stricted, operture small, hip and columella expanded, but slightly reflected; greyish white, here and there obliquely marked with pellucid strenks" (Reac)

Hab India. near the head-waters of the Sinde (Benson), Sub-Himalayan Rauge, left bank of Sutley (Hutton), Darjeening (Hanley & Theobald), Jinlum Valley, Kashmir and Salt Range (Theobald), Mandi (Stoliczka), Kussini Ghat, Punjab (Theobald)

Afghanistan. Khyber Pass (Barr), Cherat (Ancey)

The present species and E kunawureness are closely related. but whereas the latter is simistral, L'emdica is dextral and has the last whorl proportionately much higher The Theobald collection contains shells from various localities, those from the hills between the Sutley and the Jumna being transversely streaked with a rulous tint and constituting a connecting-link with E rufistrugata, but the latter has a more convex spire and its aperture is not so high; they measure 24×75 mm. Others from the Salt Range vary in dimensions between 21 x 75 to 17 x 65 mm. A shell from Kussial Ghat, Punjab, measures 195×6 mm, while two pure white Kashmir specimens attain a length of 32 mm. with a diameter of 10 min

217 Ena domina, Benson

Bulunus domina, Benson, A. M N H ser 2, xix, 1857, p 327; Pfeisfer, Mon Helic Vir Iv, 1859, p 425, Hanley & Theobald, Conch Ind 1870, pl 22, fig 5
Buliminus (Petraeus) domina, Nevill, Hand List, i, 1878, p 136

Bulimina (Zebrina) domina. Pfeiffer & Clessip. Nomencl Helic V1v 1881. p 294

Napæus domina, Theobald, J A S B 1, 1881, p 47

Buliminus dominus, Westerlund, Fauna Palaaret Binnenconchyl in, 1887, p 74, ibid, Katal Palaaret Binnenconchyl ibid, Syn Moll Extramar Reg Palæaret 1, 1897, p 13 Buliminus (?) domina, Kobelt, Conch-Cab, Fam Buliminidae.

1900, p 684, pl 103, fig 16

Buliminus (Subzebi inus) domina, Kobelt & Mollendorff, Nachr Deuts Malak Ges 1903, p 48

Original description .- "Testa sinistrorsa, rimato-pertorata, ovato-cylindrica, oblique striatula, albida, strigis obliquis rufocorneis picta, spira cylindrica, superne celeritei attenuata, apice acutiusculo, sutura impiessa, anfractibus 8 convexiusculis. ultimo 3 testæ vix æquante, basi rotundata; apertura vix obliqua. semiovali, peristomate undique expanso, marginibus conniventibus, callo brevi junctis, sinistro superne arcuato, columellari dilatato

"Long. 23, diam. 9 mill, long ap 9, lat 6 mill" (Benson) Hab India. Kashmii (Lady Gomm); Murree, Kashmir (Theo-

bald), Tandiam, Hazara, Punjab (Theobald).

According to Theobald the present species cannot be separated from E. candelaiss. Pfeiffer, as he considered the main distinction to be in the texture of the shell. A careful examination of a considerable number of the two species, however, has convinced me that they can be readily distinguished, not by the texture, but by the shape of the shell, domina having a much greater diameter in proportion to its length, while it is also much more marked with dark transverse stienks, candelan is being generally of a chalky white, only the upper whorls occasionally being variegated in this manner

The Theobald collection contains dextral forms of E domina, from Tandiani, Hazara, a station at an elevation of 5000 feet, and sinistral specimens from Mari [Murice]. The former range from 29 5 \times 9 5 to 26 5 \times 9 25 mm , and the latter measure 30 5 \times 10 mm There are besides in the British Museum two shells collected by

Major Spratt at Lundi Kotal.

218 Ena longstaffi, sp n.

Shell moderately umbilicated, fusiform-pyramidal, white, shining, distantly and irregularly striated, the strice crossed by obsolete Whorls 9, the protoconch—consisting of 2 whorlssmooth and polished, rather convex, the remainder more flattened, increasing rather rapidly, the last slightly ascending, equalling Aperture scarcely Spire subconoid, suture shallow of the spire oblique, obovate, margins counivent, united by a thin callus on the parietal wall; peristome slightly thickened, expanded, and reflexed, with acute edges, upper, outer, and basal margus regularly curved, columellar margin vertical, triangularly dilated umbilicus narrou, runate, subangulated around the base of the shell.

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Length 31, diameter 12 mm; aperture diam 115, height 8 mm

Hab India · Samana Tsuk (6740 feet), near Upper Kuram Valley, N.W Frontier Prov. (D. T. G. Longstaff) Type in the British Museum

This new species is allied to E griffith, Reeve, from Afghanistan I was, in fact, at first inclined to regard it merely as a variety of that species. Although possessing one whorl more, it is considerably shorter than griffith, which measures 40 mm in length, it is less slender in the spire, the last whorl is relatively smaller, and the aperture is much less expanded especially towards the





Fig 91 - Ina longetaffi

base E longstaff also bears traces of affinity to comita, Reeve, and E domina, Benson, but may readily be distinguished from either by its less conoid, more attenuated spire. From E candelaris, Pfeisfer, another allied form, it differs in the greater relative length of the last whork, the conoid spire, the widened aperture, and the more developed peristome.

Dr Longstaff, who collected the shell in 1906, presented five specimens, which range in size from 31×12 mm (type) to 26×11 75 min

The illustrations represent the type in the British Museum.

219 Ena eremita, Reeve

Bulimus eremita (Benson), Reeve, Conch. Icon v, 1849, Bulimus, pl 78, fig 573, Pfeiffer, Conch. Cab. Bulimus, 1853, p. 71, pl 20, figs 21, 22, ibid., Mon. Helic. Viv. iii, 1853, p. 356; Hanley & Theobald, Conch. Ind 1870, pl 23, fig 6, Ancey, Bull Soc. Malac. France, iii, 1886, p. 35.

Bulimus (Lna) eremita, Pfeiffer, Malak. Blatt. ii. 1856, p. 153.

Buliminus ei emita, von Martens, Malak Blatt xv, 1868, p 161. ibid, Jmp Obsh Lyubi Estest Antiop Etnoghr xi, part 1, 1874, p 18, pl 2, fig 13, Ancey, Bull Soc Zool France, xviii, 1893, p 43, Westerlund, Syn Moll Extramar Reg Palæaict 1,

Buliminus (Petrdeus) er emita, Nevill, Hand List, 1, 1878, p 134 Bulimina (Petracus) cremita, Pfeiffer & Clessin, Nomencl Helic

Viv 1881, p 287

Viv 1881, p 256

Bulumnus (Subzebrinus) eremita, Westerlund, Faura Palaarct

Binnenconchyl in, 1887, p 66, ibid, Katal Palaarct Binnenconch 1890, p 90; Kobelt in Rossmassler, Iconogr iv, 1876,
p 62, pl 135, fig 1330, New Series, in, 1888, pp 38, 39, pl 100,
figs 574, 575, 578, x, 1903, p. 55, pl. 291, fig 1872 ibid.,
Conch.-Cab, Fam Buliminidae, 1902, p. 951, pl 183, fig. 7 Pupa spelæa, Hutton, J. A S. B xvm, 1849, p. 653

Original description :- "Shell cylindrically oblong, rather deeply umbilicated, whorls eight in number, convex, obscurely rather irregularly striated, aperture obliquely produced, columella broad, lip a little expanded; bluish white" (Reeve)

Long. 18-22, diam 7.5-9 mm.

Hab. India: Salt Range, Punjab (Theobald); Subathor, near Simla (Hutton); Lundi Kotal (Spratt). Tibet (Mus Cuming)

Afghanistan · Bolan Pass (Hutton)

Two specimens in the British Museum labelled "Pupa spelæa, Bolan Pass," received from Capt Hutton, have convinced me that this form is cospecific with Bulimus cremita. They are indeed a trifle darker in colour and have the outer margin of the peristome not quite so much curved, but these slight differences are insufficient for separating the two forms. Both names having been published in 1849, I was at first uncertain which had priority. The sheet accompanying plate 78 of the Conchologia Iconica is dated September 1849, and although I have been unable to trace the actual date on which the part of the Journal of the Asiatic Society, containing Hutton's description, was issued, Mr. C D. Sherborn informs me that it was certainly after September. Under these circumstances Reeve's name must be adopted for the species

Ena eremita varies considerably, and some forms approach E. sindica on the one hand, and E. salsicola on the other. It has, however, a larger diameter in proportion to its length than the

former, and is less convex in the spire than the latter.

220. Ena salsicola, Benson.

Bulmus calsicola, Benson, A. M. N. H. ser 2, xix, 1857, p. 327, Pfeiffer, Mon Helic Viv. iv, 1859, p 423, Hanley & Theobald, Conch. Ind 1870, pl. 20, fig. 8.

Bulimmus (Petraeus) salsıcola, Nevill, Hand List, 1, 1878, p 134.
Bulimmus (Petraeus) salsıcola, Pfeiffer & Clessin, Nomenci Helic. Viv. 1881, p 287,

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Bulimmus (Napacus) salsicola, Kobelt, Conch-Cab, Fam. Bulimimdae, 1899, p 564, pl 8d, figs 17, 18 Buliminus (Subzebrinus) salsicola, Kobelt & Mollendorff, Nachr. Deuts Malak Ges 1903, p 49

Organal description.—"Testa rimata, ovato-cylindrica, tenui, sursum conica, læviuscula, oblique obsolete striațula, albida, maculis quibusdam translucentibus obscuris notata; sutura impressiuscula; apice subpapillari, obtusiusculo, anfractibus 6½ planiusculis, ultimo ¾ testæ superante, subtus prope rimam compressiusculo, apertura vix obliqua, truncato-ovata; peristomate plane reflexo, marginibus conniventibus, dextro arcuato, callo parietali brevissimo, crassiusculo, tuberculum obsoletum angularem exhibente, junctis

"Long 18, diam 8 mill, long apert 8, diam 6 mill."

(Benson.)

Hab. India. Pentepotomia (Theobald); Salt Range (Theobald).

"It is possible that this shell may exhibit coloured markings, like those of some other Punjab species, B. pretiosus, sindicus, etc., when in fine condition—It has a strong resemblance in form to the larger B berthelots, Pfr., and is also allied to the Levantine B chrenbergi" (Benson)

The type of E salsucola appears to have shared the fate of several other Bensoman types, for Dr Da caster informs me that it cannot be found. When Benson compared this species with B bertheloti he must have overlooked eremita, to which it bears a far greater resemblance, it has, however, a more convex spire than the latter. It also approaches domina, but is not so strongly sculptured, while it is more distinctly subangulated around the umbilicus, which is also more open. Several specimens in the Theobald collection, from the Salt Range, Punjab, measure 22×10 mm and 21×9.75 mm

The shell figured by Dr Kobelt in Conch.-Cab. is different from that in Conch Ind, and possesses one whorl more.

221 Ena cœlebs, Pfeiffer.

Bulimus çælebs (Benson), Pferffer, Symb Hist Helic in, 1848, p 83, ibid, Mon Helic Viv ii, 1848, p 119, Reeve, Conch. Icon v. 1848, Bulimus, pl 47, fig 301, ibid, 1849, pl 69, fig 498, juv, Pferffer, Conch-Cab, Bulimus, 1856, p 260, pl 70, figs 12, 13, Hanley & Theobald, Conch Ind. 1874, pl 80, fig 1
Bulimus (Merdigerus) coelebs, Albers, Die Heliceen, 1850, p 180.
Bulimus (Ena) cœlebs, Adams, Gen Rec Moll ii, 1855, p 160
Bulimus (Ena) cœlebs, Pferffer, Malak Blatt, ii 1856, p 153
Bulimius (Napaeus) coelebs, von Martens, Die Heliceen, ed. 2, 1860, p 234
Bulimius (Petraeus) cœlebs, Nevill, Hand List, i, 1878, p 134
Napæus cælebs, Theobald, J A S B xlvii, 1878, p 145
Bulimina (Ena) cœlebs, Pferffer & Clessin, Nomencl. Helic Viv. 1881, p 290

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> Bulminus (Ena) coelebs, Kobelt, Conch-Cab, Fam Bulminidae, 1901, p 687, pl 103, fig 21 (corrected to Subzebrinus on page 1007) (1902)

Buliminus (Subzebrinus) coclebs. Kobelt & Mollendorff. Nachr

Deuts Malak Ges 1903, p 47

Original description -"T profunde rimata, oblongo-acuminata, tenuis, striatula, lineis confertis, spiralibus sub lente decussatula, pallide cornea, diaphana, strigis obliquis, albidis, opacis variegata, anfr 7-8 vix convexiusculi, ultimus 1 longitudinis subæquans, basi turgido-subcompressus, apertura ovalis, perist tenue, expansum, intus sublabiatum, marginibus subconniventibus, columellari brevi, dilatato, patente.

"Long 20, diam 71 mill" (Pfeiffer)

Mussoorie (Hutton); Almorah, N.W Prov Hab. India (Pferffer), Namı Tal (Stoliezka); Kumaon, W. Himalayas

(Benson), Kashinir (Theobald)

Ena collebs resembles E. domina in outline, but it is smaller. thinner in texture, and its sculpture is less coarse. It is provided with dense wavy spirals like E pretiosa, but has a more contracted aperture than that species, and the peristome is more expanded, while the spire is more convex. The British Museum possesses fifteen specimens collected by Hutton at Mussoorie, measuring long 18-19, diam 7 mm, and twelve shells from Almorah, received from the same naturalist, ranging in size from 17.5×8.25 to 15 x 8 mm

222 Ena pretiosa. Reeve

Bulimus metrosus (Cantor), Reeve, Conch. Icon v. 1840, Bulimus, pl. 83, fig. 619, Pfeiffer, Mon. Helic. Viv. 111, 1853, p. 351, ibid., Conch. -Cab., Bulimus, 1853, p. 70, pl. 20, figs. 27, 28, Hanley & Theobald, Conch. Ind. 1870, pl. 23, fig. 7 Bulimulus (Ena) pretiosus, Adams, Gen Rec Moll 11, 1855, p 161 Bulimus (Ena) pretrosus, Pfeiffer, Malak Blatt 11, 1856, p 153 Buliminus (Petiacus) pictiosus, Nevill, Hand List, 1, 1878, p 134 Napæus pretiosus, Theobald, J A S B xlvn, 1878, p 146 Bulimina (Ena) pi etiosa, Pfeister & Olessin, Nomencl Helic Viv 1881, p 291 Buliminus (Subzehi mus) pietiosus, Kobelt & Mollendoiff, Nachr Deuts Malak Ges 1903, p 49

Original description - "Shell cylindrically ovate, compressly umbilicated, whoils smooth or finely structed, columella broadly vertically dilated, aperture rather small, nearly orbicular, hip thinly reflected, pale horny, transparent, waved with numerous opake-white streaks" (Reeve)

Long 21, diam 10 mm (ex icon.)

Hab India Chillianwalla, Banks of Jhilum, Kashmii (Cantor),

Jillum Valley (Theobald), Tinali (Stoliczka)

Theobald states that the species occurs sparingly throughout the Jhilum Valley below Uri, but is nowhere common except ENA 251

about Kathan fort on the right bank, where it is abundant, although he saw only dead shells. He further observes that its range must be very limited, not having noticed it to the eastward,

or anywhere in the cis-Ravi country

E metiosa has a close affinity with such species as E elemita and E calebs, but is more consid in the spine than the former and considerably smaller than the latter, being also differently From E rufistrugata, another ally, it may be separated by the broader base and the more convex spine Three specimens in the Theobald collection are from the type locality. They agree with Reeve's figure, except in size, measuring 16 x 7 5 mm They are rather thin in texture, and are densely covered with excessively minute, wavy spirals, a feature not mentioned in the original description The upper margin of the peristome strongly In the British Museum are also five specimens arches forward collected by Major Spratt at Lundi Kotal These range in size between 21×8 , 185×7 , and 16×7 mm

223 Ena mainwaringiana, Nevill

Buliminus (Petræus) mainivaringianus, Nevill, Sci. Res. Second. Yarkand Miss., Moll. 1878, p. 19, fig. 28

Napæus mainivaringianus, Theobald, J. A. S. B. 1, 1881, p. 47

Buliminus (Subzebrinus) mainivaringianus, Kobelt, Conch.-Cab. Fam. Buliminidae, 1902, p. 937, pl. 132, figs. 1, 2

Original description —"Nairowly and superficially rimate, subcylindrically coincal, of stout, smooth, and polished substance, striated, strike less oblique than in the preceding [stoliczkanus], fewer and more regular, not clowded together in the same way, here and there one more developed than the others, with intermediate ones more or less obsolete, light horny-brown, variegated with opaque white markings, as in B pretiosus, these markings are fewer, of a more zigzag, broader, and more irregular nature than those of the preceding; spile produced, apex scarcely obtuse, whorls 7, the three apical ones unusually short compared with the others, last whoil compressed, aperture very small, almost as broad as high, peristonic pure white, outer margin considerably thickened; columella very broadly reflected, straighter than in the preceding, slightly subangulate, instead of rounded, at base

"Long 10, diam $4\frac{1}{2}$ (last whorl to base of aperture, $5\frac{1}{4}$), apert alt $3\frac{\pi}{8}$, lat. 3 mm"

Hab. India · Murree (Stoliczka); Pakli Valley, Tandiani Hills,

4000-5000 ft (Theobald), Lundi Kotal (Spratt)

"There is no Indian species with which I can compare this species. As to shape, the nearest I know of are some small dwarf forms of Cylindrus insularis, the species is, however, next allied to B pretiosus and B rufistrigatus' (Nevill)

Theobald collected what he took to be a variety of this shell on the hills north-west of the Pakh Valley from 4000 to 5000 feet, 252 ENIDA.

where he says it is not rare locally. He continues, "It has one whorl less than the type (which is described as having 7), but is slightly larger, a difference probably due to the lesser elevation at which my specimens lived. Shell with six whorls, outer edge of aperture not quite so convex, or full, as in Nevill's plate. In most other respects corresponding with the description of the type. The surface under a lens displays a microscopically decussated sculpture, not mentioned in the type. Two varieties occur var major, long. 15, lat. 6.2 mill; var. intermedia, long. 12, lat. 4.4. This last I do not term 'minor' as it is actually larger that the type from Mari."





Fig 92 —Ena mainwaringiana, large form 3

The species is characterized by the large body-whorl and the strong decussated sculpture. It varies in size like most of the members of the group. Dr. Kobelt records specimens from Tandiani, in the Mollendorff collection, 14.5×7.5 mm., while the Theobald collection contains shells from the same locality, measuring from 13.75×5 to 11×4.5 mm. The same collection comprises a series from the Ibilium Valley, above Kohala, considerably larger than typical mainwaingiana. Two of these are here figured; they have the following dimensions:—16.5 × 8.5 and 15×7 mm.; while two others appear sufficiently distinct to base two new varieties upon them.

Var. tumida, nov.

Twice the length of the type and nearly three times its diameter.



Fig 93—Ena mainwaringiana, var tumida. } Long. 21-5, diam. 11 mm.

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Var dominula, nov.

Twice the length of the type and more than twice its diameter.



Fig 94 -Ena mainwaringiana, yar. dominula

Long 21 5, diam. 9 5 mm.

224 Ena rufistrigata, Reeve

Bulimus rufistrigatus (Benson), Reeve, Conch Icon v, 1849, Bulimus, pl 78, fig 670, Pfenffer, Mon Helic Viv m, 1853, p 350, ibid, Conch -Cab, Bulimus, 1853, p 69, pl 20, figs 29, 30, pl 21, figs 16, 17, Hanley & Theobald, Conch Ind. 1870, pl. 23, fig 10
Bulimulus (Ena) rufistrigatus, Adams, Gen Rec Moll ii, 1855,

p 161

Bulimus (Ena) refistregatus, Pleisser, Malak. Blätt. u 1856, p 153 Buliminus rufisti igatus, von Martens, Malak. Blatt xv 1868. p 158

Buliminus (Petraeus) rufistrigatus, Nevill, Hand List, i. 1878. p 134

Napæus rufistrigatus, Theobald, J. A. S. B. xlvii, 1878, p. 146, Westerlund, Katal Palaaret Binnenconch 1890, p. 91, ibid, Syn Moll Extramar Reg Palmarct. 1, 1897, p 11

Bulimmus rufistrigatus, Kobelt in Rossmässler, Iconogr vn. 1880. p 44, pl 198, figs. 1991-1993

Bultmina (Ena) rufistrigata, Pfeisser & Classin, Nomenci Helic Viv 1881, p 290

Buliminus (Chondrulopsis) rufistrigatus, Westerlund, Fauna Paläarct Bunenconchyl. 111, 1887, p 70

Bulimmus (Subzebrinus) rufistrigatus, Kobelt & Mollendorff, Nachr Deuts Malak Ges 1903, p 49

Original description —"Shell cylindrically oblong, compressly umbilicated, whorls eight in number, flatly convex, smooth, minutely crenulated at the sutures, aperture rather small, nearly orbicular; fulvous horny, irregularly finely streaked with opakewhite." (Reeve)

Long 17, diam 7 mm (ex 100n).

Hab. India base of the lower range of the Himalayas, between

254 ENIDA

the rivers Jumna and Sutley (Hutton); Jinlum Valley (Stoliczka) Common on the outer hills from the Jumna to the Indus [Kashmu] (Theobald); Lundi Kotal (Spratt)

"Communicated to Mr. Benson by Capt. Hutton with the title Pung strugata, of which the specific name is occupied in the present

genus" (Reeve)

Hanley considers sufistrujatus a somewhat doubtful species (Conch. Ind. p. 12), running into pretiosus and eremita, while Theobald (J. A. S. B. alvii, 1878, p. 146) states that "closely allied to this species and with difficulty separable in a large series, are elemita, sindicus, salsicola, and spelarus."

Var gracilis (Benson), Hanley & Theobald, Conch. Ind 1870, p 10, pl 20, fig 4; Nevill, Hand List, 1, 1878, p 134

Smaller and slenderer than the type Length 11 mm Hab India Kashmir (Stoliczka); Kakerhati (Theobald)

With the foregoing observations I entirely associate myself, but would exclude spelaus, as being absolutely synonymous with enemita, while I would add domina. With the large series of these species before me I have experienced great difficulty in defining their limits. On the whole, I would consider rufistrigata as being the smallest of the group and distinguishable from enemita by the more convex spire. Like most of the other members of the group, it occurs in sinistral as well as dextral specimens, the former being represented by a shell in the British Museum, collected at Simla by Hutton, and measuring 17×7 mm, together with three dextral ones. The species has also been found at Lundi Kotal by Major Spratt. The variety gracilis, again, connects the species with E beddomiana, but differs principally from that species in having the last whorl proportionately larger. Five specimens of this variety from Kakerhati are in the Theobald collection.

Subgenus SERINA, Gredler

Serma, Gredler, Gymnasialproga Bozen, 1898, p 10 (as Genus), Mollendorff, Ann Mus Zool St Petersburg, vi, 1902, p 356 (as Subgenus of Buliminus), Wiegmann, tom cit p. 270 (anatomy), Kobelt & Mollendorff, Nachr. Deuts Malak Ges 1903, p 58

TYPE (first species) Serina cathaica, Gredler.

Range China, India

Shell more or less cylindrical-turreted, many-whorled, whorls convex, aperture oblong-roundate, peristome widely expanded, scarcely reflexed, margins united by a distinct callus

Jaw scarcely or not at all dilated towards the sides.

Radula transverse, with 41-48 teeth, of which the central and the first 4 or 5 laterals are in some species unicuspid, sometimes showing rudiments of outer side cusps.

255 ENA.

Genital system approaching the general type of Pupundius, Petrocomastus, and Subzebrunus, being especially characterised by the unusual length of the spermatheca duct which, after separating from the ovisperin duct, with its diverticulum reaches far beyond the albumen gland, greatly exceeding the latter together with the ovisperm duct in length, in some species even 44 or 5 times The appendix of the penis, on the other hand, is much shorter. not reaching as far as the albumen gland, and attaining only 1 or at most & the length of the penis (Wiegmann)

225 Eng tandiamensis, Kobelt (emend.)

Buhminus (Subzebrinus) tandjanensis, Kobelt, Conch - Cab, Fam Buliminidae, 1902, p 939, pl 132, figs 5, 6

Original description -- "Testa angusta rimata, ovato-conica, tenutuscula, striatula, albida, strigis fuscis crebris ornata, summo Spira regulariter conica lateribus vix convexiusculis, apice submamillato; sutura linearis, anfractus 7 vix converiusculi leniter accrescentes, ultimus major, postice altitudinis 2 superans, basi rotundatus, initio obscure subangulatus, antice Apertura vix obliqua, truncato-ovalis, intus hand ascendens strigis translucentibus, peristoma acutum, tenuiter albolabiatum. expansum, marginibus vix convergentibus; haud junctis, columellari bravi, subarcuato

"Alt 105, diam max. 55, alt apert obl. 4.5 mm" (Kobelt)

Hab. India. Tandiam Hills. Punjab.

This species has affinity with E kuluensis, but possesses a shorter, more conoid spire, composed of seven whorls, whereas in kuluensis eight whorls may be counted. The aperture of tandiamenses is also more dilated. It is quite possible that with larger series the two forms will be found to intergrade insensibly.

226 Ena kuluensis, Kobelt

Buliminus (Subzebrinus) kuluensis, Kobelt, Conch.-Cab, Fam Bulimınıdæ, 1902, p 938, pl. 132, figs 3, 4

Original description :- "Testa breviter rimata, ovato-turrita. subfusiformis, obsoleta striatula, tenuiuscula, parum nitens, albida, strigis fuscis subregulariter picta, summo fusco Spira primum cylindrica, dein conica, apice obtusulo, sutura linearis, parum impressa Anfractus 8 lente ac regulariter crescentes, ultimus postice 2 altitudinis occupans, subcylindricus, basi rotundatus. Apertura fere verticalis, ovata, parum antice vix ascendens lunata, peristoma tenue, expansum, marginibus vix conniventibus, externo et basali albolabiatis, columellari vix dilatato

"Alt 13, diam max 5, alt. apert obl 4 mm" (Kobelt)

Hab. India Kulu, W. Himalayas.

256 ENID E.

Received by Mollendorff from the late Miss Linter as B rufo-

strigatus var. gracilis.

Five specimens in the Theobald collection, from Kakerhati, I refer to E kuluensis It is shorter and more conoid than suffstraata.

227. Ena beddomeana. Nevill.

Buliminus (Petræus) beddomeanus, Nevill, Sci. Res. Second Yarkand Miss, Mollusca, 1878, p. 20, fig 29
Napæus beddomeanus, Theobald, J. A. S. B. l, 1881, p. 47 Buliminus (Subzebrinus) beddomeanus (Nevill), Kobelt, Conch -Cab, Fam. Buliminidae, 1902, p 939, pl 132, figs 15, 16

Original description - "This is a very interesting species, resembling somewhat, in shape of the whorls and aperture, B smither, 'Conchologia Indica,' pl. xx, fig 3, but it is still nearer B eremita, Bens, l. c. fig. 8, from which its produced spire, parrower whorls, and aperture easily distinguish it Narrowly rimate, subcylindrically turreted, of solid, scarcely polished substance; closely, obliquely striate, striæ more regular and crowded together than in the two preceding forms [stoliczkanus and mainwaringianus]; of a very pale horn-colour, only



Fig 95 —Ena beddomiana, var. turrita

here and there discernible, on account of the crowded strix, which are of a chalk-white colour, spire much produced, apex obtuse, whorls 10, increasing very gradually and regularly, last whorl compressed, aperture very small, peristome white, outer margin broadly reflected, very slightly arcuate (much as in pl. xx, fig 3, l c); columella dilated, obliquely rounded at base

"Long $13\frac{3}{4}$, diam. $4\frac{3}{4}$ (last whorl to base of aperture, 5), apert alt. $3\frac{1}{2}$, lat $2\frac{7}{8}$ mm." (Nevill)

Hab. India Murree, Punjab (Nevill), Tandiani, Hazara

(Theobald), Campbellpur (Yerbury).

Three varieties are indicated by Theobald as occurring at Tandiani, the hill station of Hazara, the most northern portion of the Punjab and bordering on Kashmir, where he says the species is rather common. The varieties he mentions are var. typica, 10 whorls, long. 124, lat 2.6 mill; var turrita, 11 whorls, long. 124, lat. 3 mill; var. pusilla, 9 whorls, long 85, lat

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25 mill. The var turrita is here illustrated from a specimen in the Theobald collection in the British Museum, fig 95 c, showing the aperture enlarged Theobald further states that it is the most aberrant species of the genus, and that the flat expanded peristome, it sometimes displays, suggests a relationship to some Pupa, such as P. canopicta.

Kobelt, when describing and figuring the species, appears to have been ignorant of the fact that a description and figure of it had already been published by Nevill Kobelt's specimen is somewhat smaller than Nevill's type, the dimensions of the former

being given as. alt 10, diam 4, ap. alt 3 mm

The Theobald collection contains four specimens which may be considered typical, having ten whorls and measuring 12 mm in length, these are from Kakerhati, on the Simla Road. Four other shells have nine whorls, and measure 9 mm in length, and may be referred to Theobald's var. pusilla; they agree with Kobelt's figures based on specimens from Tandiani in the Mollendorff collection, while, finally, four more specimens of eleven whorls, from Tandiani, pertain to the var turnia, one measures 13 25 × 35 mm, and another, which is here figured, has the following dimensions length 11 25, diam 35 mm. The British Museum further possesses a specimen of the latter variety, collected by Major Yerbury at Campbellpur, situate to the south-west of the Hazara Hills.

228 Ena hazarica, sp n.

Shell turreted-fusiform, finely obliquely striated, pale corneous, rather solid. Whorls 11, slightly convex, increasing slowly and regularly, the last scarcely wider than the penultimate, slightly

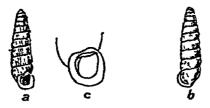


Fig 96 — Ena ha-arica 📑

ascending near the aperture. Spire straight, apex blunt, suture impressed. Aperture subquadrate-ovate, margins distant, united by a callus on the parietal wall, with a denticle near the upper margin; peristome thickened, strongly and flatly expanded, upper, outer, and basal margins evenly curved, columellar margin transgularly dilated, slightly curved, forming an obtuse angle with the basal margin. Umbilicus contracted, leaving only a narrow perforation.

Length 13, diam. 275 mm

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Hab India: Tandiani, Hazara, N.W. Frontier (Theobald)

Type in the British Museum.

The shell on which this new species is based occurred with several specimens of *E beddomiana*, var. *turrita* in the Theobald collection. It differs from that form in the more slowly increasing whorls, the last being scarcely wider than the penultimate, and in the smaller aperture, it also differs in its dimensions, the length being a little greater and the diameter somewhat smaller, while the peristome is more expanded but not reflexed. The shell consequently has quite a different facies, and can be readily picked out from among its congeners

Tandiani, the spot where the shell was taken in company with *E beddomiana*, is the hill station situate in the Hazara hills, near the Afghan frontier, at an elevation of 8500 feet, where the pre-

vailing rock appears to be limestone *.

Figs 96, a & b, give the front and back view of the shell, while fig 96 c shows the aperture

229. Ena nevilliana, Theobald.

Peronæus newlianus, Theobald, J. A. S. B. 1, 1881, p. 48

Buliminus (Ena) newllianus, Kobelt, Conch. -Cab., Fam. Bulimindae,
1902, p. 880, pl. 128, figs. 1, 2

Buliminus (Subzebrinus) newllianus, ibid. tom. cit. p. 1045

Original description — "Testa turrita, rimata, costanea [castanea], anfr. 8 ad 9 convexiusculis, transverse plicatis, lineisque spiralibus leviter decussatis, ultimo brevissime ascendente. Apertura oblonga, verticali. Margine pallido, simplici, expansiusculo, et juxta columellam breviter reflexo.

"Long 157, lat 4.1 mill., ad long. 119, lat. 4 mill" (Theo-

bald.)

Hab. India: Tandiani, Hazara hills, Punjab, 8500 ft. (Theobald); Lundi Khotal (Spratt).



Fig 97 —Ena nevilliana Shell 3, sculpture 5

The species had remained unfigured until Dr Kobelt illustrated it from a specimen in the Mollendorft collection. The shell is strongly irregularly costulate-striate, the stries being cut by coarse incised spirals; it is dark fuscous in colour, not flammulated.

^{*} Theobald, J A. S. B 1, 1881, p 47

259 PUPOIDES

The Theobald collection contains two batches of the present species, both from Tandiani; one of four specimens was duly so labelled by Theobald and marked type. One of these is shown, together with the enlarged sculpture, in fig. 97 a. The second batch consists of five shells which were unnamed by Theobald: although the spirals cutting the transverse ribs are not quite so far apart as in the other shells, and the resulting head-like sculpture is consequently not quite so coarse. I have no hesitation in referring this form likewise to E nevilliana One shell is depicted in fig 97 8

Genus PUPOIDES, Pfeiffer.

Pupoides, Pfeiffer, Malak Blatt. i, 1854, p 192 (as section of Bulimus, for B nitidulus, Pfeisser, and B. marginatus, Say), Pilsbry & Vanatta, Proc Acad Nat Sci Philadelphia, 1900, p 585 (genus); Kobelt, Conch-Cab, Fam Bulmundae, 1902, p 917, Kobelt & Möllendorff, Nachr Deuts Malak Ges 1903, p 70

Leucochila, von Martens, Die Heliceen, ed 2, 1860, p 296 (as section

of Puna)

Leucochdordes, Pfeiffer & Clessin, Nomencl Helic. Viv. 1881, p 292 (as subsection of Ena)

Tipe. (first species) Bulimus nitidulus, Pfeiffer.

Range. Southern Asia, Equatorial Africa, Australasia, North America, Antilles, and South America.

Shell small, elongate-ovate, rather smooth, corneous; spire elongate, conoid, whorls 54-72, convex, the last ascending in front; aperture provided with a parietal lamella; peristome widely and flatly expanded, reflexed, acute, margins approximating.

united by a callus, edentulous Some Australian and African species are sinistral, one—P con-

trarius, Smith—being amphidrome.

Anatomy uuknown

230 Papoides conopictus, Hutton.

No 7, Pupa, Hutton, J A S B m, 1834, p 85, No 7, Pupa

(min) comopieta?, indition, J. A. S. B. III, 1834, p. 85, No. 7, Pupa (min) comopieta?, ind., tom cit. p. 93

Bulimus comopietus, Reeve, Conch. Icon. v, 1849, Bulimus, pl. 69, ing. 492, Benson, A. M. N. H. ser. 2, iv, 1849, p. 127, Pfeiffer, Mon. Helic. Viv. iii, 1853, p. 349; ibid, Conch. Cab., Bulimus, 1854, p. 152, pl. 39, figs. 17–19, Blanford, J. A. S. B. xxxiv, 1865, p. 94, ibid, op. cit. xlv, 1875, p. 45; Hanley & Theobald, Conch. Ind. 1870, pl. 23, fig. 9

Bulimulus (Ena) conopictus, Adams, Gen. Rec. Moll. 11, 1855,

Bultmus (Napaeus) coenopictus, Pfeisser, Malak Blätt it. 1856.

Pupa coenopicia, Morelet, Ann Mus Civ Genova, in, 1872, p 200 Pupa (Leucochila) conopuctus, Nevill, J. A. S B rlvi, 1877, p 23, ibid, Hand List, i, 1878, p 193 (conopicta), ibid., in Anderson, Zool Res. Exp W Yunnan, i, 1879, p 882 (conopicta), Pelle, Journ Bombay Nat. Hist Soc xi, 1908, p 131.

s 2

Peronæus conopictus, Theobald, J. A. S. B. xlvii, 1878, p. 144
Bulimina (Ena (Leucochiloides)) coenopicta, Pfeisfer & Clessin,
Nomencl Helic Viv. 1881, p. 292

Bulminus (Leucochiloides) canopicta, Tryon, Struct Syst Conchin, 1884, p 54, pl 99, fig 65

Buliminus canopicius, Ancey, Bull Soc Zool France, Avin, 1893,

Pupoides coenopictus, Kobelt, Conch -Cab, Fam Buliminidae, 1902, p 918, pl 130, figs 22, 23

Bulmmus (Pupa) fallax, Jickeli, Sitz Ber Ges Naturf Fr Berlin, 1873. p 5

Buliminus (Napaeus) fallux (Say), Jickeli, Nova Acta K Leop-Carol Akad Naturi xxxvii, 1874, p 97, pl. 2, fig 1 (jaw), pl 5, fig 1 (shell).

Original description — "Shell about 21 lines in length, whorls 8, spire rather obtuse; colour brown, aperture rounded, margins reflected and interrupted by the body-whorl

"Animal with four tentacles, buttoned at the tips, the upper pair longest and bearing the eyes at the summit, colour blackish"

(Hutton, 1834)

"Shell cylindrico-pyramidal, with 6 whorls, minutely striate, body-whorl ventricose, the others gradually tapering to an obtuse apex, aperture ovato-lunate, lips sub-reflected and white within; a single tooth at the junction of the outer lip with the body-whorl, colour brown" (Hutton, 1849)

Length 4-4 5, diam. nearly 2 mm

Hab India Salt Range, Kashmir, N W Punjab (Theobald), Agra (Hutton), Delhi, Roorkee (Wood-Mason); Patna (Mainwaring); Kutch (Stoliczka), Trichinopoly, Erode (Blanford, Fairbank), Travancore (Beddome); Dinapore, Kurnal (Bacon), Bombay Is (Peile, West), Ceylon (Nevill, Beddome) Afghanistan (Hutton, Laidlaw) Abyssinia (Blanford)

In colour the shell varies from pale and dark corneous to fulvous, in some cases even rufous. It is usually more or less shining, and there are from 6 to 7 whorls, some specimens have a more elongate spire than others and the body-whorl is somewhat ventricose. In a small percentage of shells the parietal denticle near the upper margin of the peristome is obsolete or even entirely wanting

Jickeli has united under the collective name of Buliminus (Napaeus) fallax, Say, practically all the forms of the genus known to him at the time of writing, stating that the different species have been based on characters which may occur in specimens from the same locality. Bourgingnat, as might have been anticipated strongly protested against this method of uniting forms from the four quarters of the globe under a common designation and proceeded to add another new species. While admitting that the various forms closely approximate each other, on geographical grounds alone I must consider it advisable to separate them, while,

^{*} Ann Sci Nat, Zool. ser 6, xv, art 2, 1883, p 62

moreover, a careful scrutiny of large series of specimens has convinced me that P. fallan and P. conopicius, at least, may readily be separated by the characters of the peristome, which in fallax is much more strongly developed, thickened, and expanded, and has the upper margin more deflexed towards the body-whorl, forming an obtuse angle with the outer margin which is but slightly curved, whereas in example a the upper and outer margins together form a regular curve

231. Pupoides lardeus, Pfeiffer.

Bulimus lardeus, Pfeisser, P Z S 1852, p 157, ibid., Mon Helic. Viv 111, 1853, p 348, 1bid, Conch-Cab, Bulimus, 1854, p 151, pl. 39, figs 14-16

Bulimulus (Napieus) lardeus, Adams, Gen Rec Moll 11, 1855,

Bulimus (Napaeus) lardeus, Pfeisser, Malak Blätt, u. 1856, p. 153 Buliminus (Napaeus) lardeus, von Martens, Die Heliceen, ed 2, 1860,

Bulimmus (Leucochiloides) lardeus, Kobelt, Ill Conchyl. Buch, 11,

1878, p 273, pl 84, fig 12

Bulimina (Ena (Leucochiloides)) lardea, Pfeisser & Clessin, Nomencl Helic. Viv 1881, p 202

Pupoides lardeus, Kobelt, Conch - Cab., Fam Buliminidae, 1902, p 918

Original description:- "B testa subperforata, oblongo-ovata, solidula, striata, lardeo-micante, rufo-cornea; spira convexoturrita, apice obtusa, aufract 6, convexiusculis, ultimo of longitudinis vix superante, basi subcompresso; apertura subverticali, truncato-ovali, perist intus labiato, subangulatim patente marginibus remotis, callo tenui juxta insertionem dextri obsolete pliciferi junctis

"Long. 51, diam 21 mill" (Pfeiffer)

Hab. India

The Cuming collection in the British Museum contains five specimens of Pupoides lardeus. This form, which is perhaps only a variety of P. conopictus, is larger, possessing one more whorl, and is more conoid in the spire.

232 Pupoides tutulus. Reeve.

Bulimus tutulus (Benson), Reeve, Conch Icon v, 1849, Bulimus,

pl 84, fig 625

Pupa tutula, Kuster, Conch-Cab, Pupa, 1852, p 183, pl 17, figs 8-10, Pfeiser, Mon Helic Viv. in, 1853, p 535; Hanley & Theobald, Conch ind 1876, pl 156, fig 6
Pupa (Pupila) tutula, Adams, Gen. Ricc Moll. in, 1855, p 170, Pfeisfer, Malak Blatt. ii, 1856, p 176
Pupa (Leucochila) tutula, Nevill, Hand List, i, 1878, p 194 (=P.

conomicia, var), Pfeisser & Clessin, Nomencl Helic Viv. 1881. р 351.

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Pupoides tutulus, Kobelt & Möllendorff, Nachr Deuts Malak. Ges 1903, p 71

Original description:—"Shell conical, rather broad at the base, compressly umbilicated, whorls six in number, rounded, very minutely striated, columella broadly vertically dilated, with a small callosity above, aperture nearly round, lip slightly reflected, light chestnut, somewhat horny, callosity white" (Reeve)

Long. 5½, diam. 3 mill. Ap 2 mill longa, 1½ lata. (Pfeiffer.)

Hab India. Humeerpore, Bundelkhund (Benson); Delhi and
Nagpore (Wood-Mason). Kutch and Sind (Stoliczka, Blanford);

Patna (Mainwaring)

Reeve, in illustrating the species, makes no mention of the fact that his figure is enlarged, which is especially misleading owing to his invariable habit of omitting all measurement in the 'Conchologia Iconica.' There is, indeed, a note at the bottom of the page stating, "All exceedingly minute," but this is apt to be overlooked. As I have not seen any specimens I have been obliged to quote Pfeiffer's measurements taken from Benson's shells Pupoides tutulus differs from its congeners at a first glance by its much broader base.

Genus CERASTUS, von Martens

Cerastus (Albers), von Martens, Die Heliceen, ed. 2, 1860, p. 232 (as section of Buliminus), Jickeli, Nova Acta K. Leop-Carol Alad Naturf xxxvii, no 1, 1874, p. 103, pl. 2, fig. 2 (jaw and radula, Buliminus abyssinicus); Schacko, in Mobius, Beitr. Meeresf Mauritius u. Seychellen, 1880, p. 340 (radula of abyssinicus), Pteiffer & Clessin, Nomencl. Helic. Viv. 1881, p. 286, Kobelt & Mollendorff, Nachr. Deuts. Malak. Ges. 1903, p. 40 (genus)

TYPE, (first species) Bulimus distans, Pfeiffer.

Range India, Africa.

Shell rimate, ovate, costulate or striate, thin, corneous; whorls 6-7 convex, last whorl about equalling the spire; aperture rotundate-ovate, peristome reflexed, margins approaching, united by a thin callus.

Jaw 15 mm across, slightly curved, yellowish corneous, strong, and exhibiting distinct, fairly regular lines of growth, which are crossed by stronger transverse striæ, which under a more powerful

lens appear as u regular fine riblets. (Jickeli.)

Radula 4 mm. long, 15 mm. broad, tapering anteriorly, with 133 transverse rows, which ascend towards the margin, then descend and terminate horizontally Longitudinal rows from 91 to 101. Central tooth varying from 0 030 to 0 036 mm. in length Laterals characterized by prominent cutting edges on either side, and a basal plate elongated posteriorly and projecting somewhat wing-like towards the outer side (Jicheli)

Genitalia unknown

233. Cerastus abyssinicus, Picifier.

Rulimmus habesenneus (Ruppell), Beck, Index Moll 1838, p 68

(nom nud)

nom nud)

Bulimus abyesinicus (Rupp), Pfeisser, Zeit. Malak ii, 1845, p. 157, ibid, Mon Helic Viv ii, 1848, p. 110, Recve, Conch Icon v, 1848, Bulimus, pl. 46, sig. 296, Pfeisser, Conch-Cab, Bulimus, 1854, p. 149, pl. 39, sigs. 6, 7, Pfeisser, Mon Helic Viv vi, 1868, p. 55, Morelet, Voy Welwitsch, Moll. 1868, p. 40, ibid, Ann Mus Civ Genova, iii, 1872, p. 187, Hanley & Theobald, Conch. Ind 1870, pl 21, fig 1, Bourguignat, Ann Sci Nat. Zool ser 6, xv, 1883, art 2, p 55, pl 9, fig 59, ibid, Moli Afr Equat 1889, p 50

Bulimus (Petraeus) abysamcia, Albers, Die Heliceen, 1850, p. 184,

Pfeiff r. Malak Blätt, n. 1850, p 151

Bulimulus (Petraus) abysemicus, Adams, Gen Rec Moll ii. 1855. p 162

Buliminus allyssinicus, var ventrosa, Martens, Malak Blatt. xvi.

1869. p 210

Buliminus (Petraeus) abyssinicus, Jickeli, Nova Acta K Leop -Carol Akad Naturf xxxvii, no 1, 1874, p 103, pl 2, hg 9 (jaw and radula), pl 5, fig 2 (shell)

Buliminus (Cerastus) abyssinicus, Kobelt, Illustr Conchyl Buch, u, 1878, p 273, pl 84, fig 6, Pollonem, Boll Mus Zool Torino, xm, 1895, no 313, p 6

Bulimina (Cerastus) abyssinica, Ploiffe & Clessin, Nomencl Helic

Vir 1861, p 286

Buliminus (Cerastus) abessynicus, Kobelt, Conch -Cab, Fam Bulimınıdae, 1899, p 532, pl 84, figa 9-12.

Cerastus abesemicus, Kobelt & Mollendorff, Nachr Deuts Malak Ger 1903, p 40

Bulinanus abyssinicus, var , Peile, Tourn Bombay Nat Hist. Soc xi. 1909, p 131

Original description —"Testa rimato-perforata, ovato-acuminata, tenui, regulariter et confertim arcuato costata, diaphana, corneoalbida, spira elongata, conica, anfr 7, convexis, ultimo 4 longitudinis subequante, columella subrecta, intus subtorta, apertura oblongo-ovali, perist, acuto, margine dextro arcuato, breviter expanso, columellari dilatato, patente.

"Long 21, diam 11 mill" (Pfeiffer)

India. Malua (Theobald), Manda, Nerbudda Valley (Blanford), Poona (Beddome); Bombay Island (Pale). Abyssinia

(Blanford, Ircheli, Bourguignat)

The occurrence of this species in such widely separated countries is somewhat startling, but may be accounted for by the introduction into India with plants In a letter to Pfeisfer (recorded in Mon Helic Viv vi, p 55) Benson suggested that it had beer imported with Adansonia digitata

The shell appears to vary to a certain extent, and some of the specimens figured by Jickeli seem to be immature. This same author suggested that Bulimus harrist, Reeve, is identical, but

Reeve's figure does not bear out this contention

a. abysenicus is closely related to a. distans but the shell is

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more diaphanous, the spire is shorter, the body-whorl is more inflated and the ribs are more distant. The interstices between the coste are closely and minutely spirally striated. The figure in Conch. Ind shows a more elongated spire, the last whorl is less swollen and the aperture narrower than in typical abyssinica,

In size the species varies from 20×12 and 19×11.5 to

 $16 \times 10.5 \text{ mm}$.

234. Cerastus fairbanki, Pfeiffer.

Bulimus fairbanki, Pfeiffer, P. Z S 1857, p. 109, ibid, Mon Helic Viv iv. 1859, p 410, Hanley & Theobald, Conch Ind. 1870, pl 20, fig 9

Buliminus (Cerastus) scalaris (Hairburn), von Martens, Die Heliceen, ed 2, 1860, p 232

Buliminus (Cerastus) fan banki, Nevill, Hand List 1, 1878, p. 133, Kobelt, Conch-Cab, Fam Bulummidae, 1900, p 677, pl 102,

Bulimina (Cerastus) fairbanki, Pfeiffer & Clessin, Nomencl Helic V1v. 1881, p 286

Cerastus fairbanhi, Kobelt & Mollendorff, Nachr Deuts Malak Ges 1903, p 40

Original description —"T anguste et compresse umbilicata, ovato-conica, tenuuiscula, conferte striata et costis irregulariter distantibus compressis subarcuatis sculpta, sub lente exilissime spiraliter striata, haud nitens, fulvescenti-albida; spira conica, apice obtusa; anfr. 6 convexi, ultimus spira vix brevior, juxta umbilicum compressus; apertura parum obliqua, elliptico-ovalis, perist album, marginibus conniventibus dextro mediocriter expanso, columellari stricto, late patente

"Long. 19, diam. 91 mill " (Pferffer.) Hab. India: Ahmednuggar (Fairbank)

This is the best characterized of all the Indian species of Cerastus, on account of the prominent and widely spaced ribs, which are about 2 mm. apart. Five specimens in the Beddome collection, from Ahmednuggar, the type-locality, show that two forms may be recognized The one typical, broadly conoid, the other with more elongated spire and narrower base, the ribs are neither quite so widely nor so regularly spaced, and the form would almost constitute a passage to C. distans

235. Cerastus malabaricus, Pfeiffer.

Bulimus malabaricus, Pfoiffer, Malak Blatt iv, 1857, p 156; ibid., Mon Helic. Viv. iv, 1859, p 411

Buliminus (Cerastus) deccanensis (Blanford), Nevill, Hand List, 1,

1878, p 133 (nom. mut.)

Bulimina (Cerastus) malabarica, Pfeiffer & Clessin, Nomencl Helic. Viv. 1881, p 286 Cerastus malabaricus, Kobelt & Mollendorff, Nachr Deuts Malak.

Ges 1903, p 41

Original description — "T. anguste umbilicata, conico-ovata, solidula, conferte striata, parum mida, sordide albida; spira elongato-conica, apice obtusa; anfr. 6 convexi, ultimus ? longitudinis subæquans, juxta umbilicum leviter compressus; apertura obliqua, angulato-ovalis; perist tenue, marginibus approximatis, callo tenuissimo, superne tuberculifero junctis, devtro perarcuato, breviter expanso, columellari dilatato, breviter patente.

"Long 14, diam 71 mill Ap 61 mill. longa, 4 lata"

(Pfeiffer)

Hab India · Ahmednuggar, Deccan (Fairbank, Blanford)

The species never having been figured, I have taken the opportunity of illustrating the type in the Caming collection. The shell bears some resemblance to that of C. redfieldi, Pfeisser, being similar in shape, but it is smaller and has a narrower umbilicus. It is furnished with very fine spirals on the bodywhorl, where the transverse strike are less distinct than on the other portions of the shell.





Tig 98 - Cerastus rialabaricus

I have seen five specimens in the Beddome collection, also from Ahmednuggar, which are a trifle larger than the type, measuring 15×9 mm, and are a little more fuscous, with the body-whorl not quite so tunid

Blanford appears to have found it necessary to alter the specific name on the plea that the habitat is not in Malabar, as Pfeisffer erroneously thought, but in the Deccan In view of the admitted fact, however, that a specific name is intended to designate, not to describe," I have found it expedient to disregard the latter name and to revert to Pfeisffer's original designation

236 Cerastus jerdoni, Reeve.

Bulimus jerdom (Benson), Reeve, Conch Icon v, 1848, Bulimus, pl 46, fig 297, Pfeiser, Mon Helic Viv III, 1853, p 335, ibid, Conch-Cab, Bulimus, 1853, p 73, pl 20, figs 11, 12 Bulimus (Petraeus) jerdom, Pfeiser, Malak Blätt II, 1856, p 154 Buliminus (Cerastus) jerdom, Nevill, Hand List, 1, 1878, p 132, Kobelt, Conch-Cab., Fam Buliminidae, 1902, p 893, pl 127, f gs 17, 18

^{*} Nevill, Hand Last, 1, 1878, p 133

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Bulimina (Cerastus) jerdoni, Pfeiffer & Clessin, Nomenci Helic
 Viv 1881, p 286
 Cerastus jerdoni, Kobelt & Mollendorif, Nachr Deuts Malak Ges
 1903, p 40

Original description:—"Shell somewhat shortly ovate, largely umbilicated, spire rather short, acuminated, whorls six in number, swollen, rounded, columella broadly reflected, aperture nearly orbicular, lip expanded, scarcely reflected; dirty olive-brown" (Reeve)

Long. 18, diam. 11.5 mill. (ev icon)

Hab India Deccan (Benson), Poona (Blanford)

A shell from Ahmednuggar in the Benson collection, kindly sent for inspection by Dr. L. Doncaster, agrees with Reeve's figure, except in being paler in colour, which may be due to fading, and the outer margin of the peristome being narrower and damaged, probably as the result of rough handling. I am consequently disposed to regard this specimen as the type. The form figured by Hanley and Theobald is larger and with a less convex spire, and I refer this to the var redfields, Pfeiffer.

The species differs from C densus, Pfeiffer, in being of shorter and stouter build, of thinner texture, more finely, not plicately, striated, and in being covered with rather close, ways spirals

Var redfieldi, Pfeiffer.

Bulimus redfieldi, Pfeiffer, Malak Blatt 1, 1854, p 60

Bulimus jeidoni, var iedfieldi, Pfeisser, Mon Helic Viv iv, 1859,

Bultimus jer doni, Hanley & Theobald, Conch. Ind 1870, pl 21, fig 7.

Bulimina (Cerastus) jerdoni, var 1edfieldi, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 286

Original description —"T profunde et compresse umbilicata, ovato-conica, tenuis, oblique confertim striata, pellucida, parum nitens, cereo-albida; spira conica, apice obtusa; anfr 6 convexi, ultimus spiram aequans, infra suturam subturgidus, juxta umbilicum compressus; columella fere verticalis, medio introrsum subplicata, apertura obliqua, truncato-ovalis, perist tenue, marginibus convergentibus, dexiro perarcuato, expanso, subdilatato, columellari lato, patente.

"Long. 20, diam. 11 mill Ap 10 mill. longa, intus $5\frac{1}{2}$ lata" (Pferffer)

Hab India Ahmednuggar (Redfield); Poona (Beddome)

Described originally as a distinct species, evidently before he had seen C jerdoni, Pfeisser subsequently reduced it to varietal rank. The shell figured by Hanley and Theobald as jerdoni I refer to this variety. Three specimens from Ahmednuggar in the Cuming collection, accompanied by a label bearing the legend "B. jerdoni" in Pfeisser's handwriting, also agree with the description and dimensions of redsieldi. The Beddome collection

further comprises five specimens from Poona These range in dimensions from 21×12 to 19×11.5 mm, and have the transverse strice more pronounced and more regular than is the case in typical jerdon; the spiral incised lines, on the other hand, are not so wavy and not quite so apparent, while the peristome is more expanded, the columellar margin especially being very broadly triangular

237. Cerastus moussonianus. Petit

Bulimus moussomanus, Petit, Journ Conchyl 11, 1851, p 266, pl. 7, fig 4; Pfeiffer, Mon Helic Viv iii, 1853, p 346, Hanley & Theobald, Conch Ind 1870, pl 21, fig 4

Bulimmus (Cerasius) moustonianus, Nevill, Hand List, 1, 1878, p 132, Kobelt, Conch-Cab, Fam Bulimmidae, 1900, p 676, pl 102, fig 21 tom cit 1902, p 892, pl 127, figs 12-16

pl 102, fig 21 tom ent 1902, p 892, pl 127, figs 12-16
Bulimna (Cerastus) moussoniana, Pfeiffer & Clessin, Mon Helic.
Viv 1831, p 236

Cerastus moussomanus, Kobelt & Mollendorff, Nachr Deuts Malak. Ges 1903, p 41.

Bulminus moussomanus, Peile, Journ Bombay Nat Hist Soc xi, 1908. p 131.

Original description —"B testa ovato-ventricosa, tenui, translucida, umbilicata, pallide cornea, spira conica, anfractibus senis convexis, longitudinaliter minuteque striatis; striis obliquis, apertura subrotundata, labro tenui, expanso, subreflexo; umbilico parro

"Long 16, larg 9 mill" (Petit)

Hab. India: Bombis (Charbonnier), Ahmednuggar (Fairbank), Baroach, Khandala, and Surat (Blanford, Fairbank); Sholapur (West), Bombay Island (Peile), Kutch (Stoliczka)

Petit states that it is near B abyssimous, but shorter and not

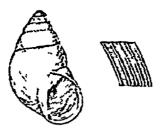


Fig 99 - Cerastus mousconianus, var Shell 3, sculpture ;

as widely umbilicated, while Kobelt considers it probably a variety of that species Pfeiffer and Clessin, on the other hand, are rather inclined to regard it as synonymous with B charbonniers, Pfr

To judge from Petit's original figures I must consider it nearer to C abyssinicus, but it has a more inflated body-whorl and the ribs appear more crowded From C charbonnier it may be

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separated by the shorter, more compressed spire, and from C. distans by the shorter spire, the broader base, and the coarser and more distant ribs, while, on the other hand, it agrees with C densus in having the columellar margin of the peristome broadly and triangularly dilated, forming a distinct angle with the basal

margin

I here figure a shell (fig. 99) in the British Museum from Sholapur, Central India, received from Arthur A. West, which has a more elongated spire than typical moussonianus, measuring 18×115 mm and somewhat approaches C. distans in shape, while fig. 100 represents another specimen in the British Museum, labelled "India" only, the latter approximates closely to Petit's original figure, except in being a trifle smaller, measuring $15.5 \times 10.5 \text{ mm}$.



Fig 100 — Cerastus moussonianus Shell 2. sculpture \$

Three specimens in the Cuming collection, collected by Fairbank at Ahmednuggar, are labelled moussonianus, Pfeiffer, they are larger than the type, being 18 mm long.

238. Cerastus segregatus. Reeve.

Bulimus segregatus (Benson), Reeve, Conch Icon v, 1849, Bulimus, pl 79, fig 587, Pferffer, Mon Helic Viv in, 1853, p 440; ibid., Conch - Cab, Bulimus, 1853, p 77, pl 21, figs 8, 9, Hanley & Theobald, Conch Ind 1874, pl 80, fig 10

Bulimus (Napaeus) segregatus, Pfeisser, Malak Blatt. ii, 1856,

p 153

Buliminus segregatus, var minor, von Martens, Imp Obsh Lyubi Estest Antrop Etnoghr xi, part i, 1874, p 21, pl 2, fig 16. Napæus segregalus, Theobald, J A. S B xlvn, 1878, p 145

Bulimina (Pachnodus) segregata, Pfeiffer & Clessin, Nomencl. Helic Viv 1881, p 284

Buliminus segregatus, Ancey, Bull. Soc. Malac France, in, 1886, p 46, Westerlund, Fauna Palaarct Binnenconchyl in, 1887, p 72, ibid., Katal Palaarct Binnenconch 1890, p 92; ibid, Syn Moll Extramar. Reg. Palæarct i, 1897, p 11

Buliminus (Chondridopsis) segregatus, Westerlund, Fauna Paläarct

ш, 1887, р 72

Buliminus (Ena?) segregatus, Kobelt, Conch-Cab, Fam Buliminudae, 1901, p 687, pl. 103, fig 20, corrected to (Subzebrinus) on page 1007 (1902).

Original description —" Shell ovately conical, somewhat pyramidal, rather swollen at the base, umbilicated, whorls seven in

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number, convex, obliquely striated, columella broad, vertical, aperture small, rounded, lip thin; dull horny," (Reeve)

Long. 11, diam 6 mm (ex icon.)

Hab. India: Simla (Benson); Chinab Valley, Kashmir (var Turkestan: Hills near Schachimardan (var. pusillus, Theobald)

minor. Fedtschenko)

Theobald records the finding in Kashmir of a single specimen of what seemed to him a variety of segregatus, but it had an ab-It measured 11.2×5 mm, and had the normal look about it ordinary horny appearance of collebs and its allies A smaller form, which he names var. pusillus, he also considered to pertain to this species and was far from rare in the Chinab Valley above 6000 feet. It only measured 9x38 mm Pfeiffer records the following measurements from shells in the Benson collection:-Long. 13, diam. 7 mm. Ap 5 mm longa, 25 lata

I have not seen specimens, and the type appears to be lost

239. Cerastus densus, Pfeiffer.

Bulimus (Petragus) densus, Pfeisfer, Malak Blätt. ii, 1856, p. 154 Bulemus densus, Pfeisser, Mon Helic Viv iv, 1859, p 424: ibid., Novit Conch. ser 1, 11, 1868, p 377, pl. 87, figs 25, 26, Hanley & Theobald, Conch. Ind. 1874, pl 79, fig 6

Buliminus (Ceratus) densus, Nevill, Hand List, j 1878, p 286;

Novit Conch. Conch. France Polymeridae 1991, p. 688, pl 1995

Kobelt, Conch-Cab, Fam. Buliminidae, 1901, p 686, pl. 103.

Bulimina (Cerastus) densa, Pfeisser & Clessin, Nomencl. Helic. Viv. 1881, p 286

Cerastus densus, Kobelt & Möllendorff, Nachr. Deuts Malak Ges 1903, p 40

Original description .- "T profunde rimata, subperforata, ovatoconica, solidula, dense costulato-striata, vix nitidula, pallide carnea; spira conica, obtusiuscula; sutura obsolete marginata; anfr. 6, convexiusculi, ultimus spira vix brevior, basi compressus; columella leviter arcuata; apertura parum obliqua, elliptico-ovalis; perist albo-labiatum, marginibus conniventibus, dextro arcuato, expanso, columellari late patente

"Long 20, diam. 10 mill. Ap c. perist 10 mill. longa, 71

lata," (Pferffer)

Hab India Malabar (Fairbank); Ahmednuggar (Blanford); Poona (Stoliczka)

Pleister indicates a var 6 "elongatus, basi subangulatus; long.

241, diam 10 mill"

The Beddome collection contains five specimens, from Ahmednuggar, which were labelled jerdons, but which, without hesitation. I refer to densus

C densus differs from C. jerdoni in having a more attenuated spire, the whorls increase less rapidly, and the lip, while more thickened, is less reflexed. The sculpture is also different, the transverse strike being a trifle coarser and more regularly spaced,

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especially on the last whorl, and the spirals are much less in evidence, being not only much more minute, but more or less

A specimen in the British Museum, acquired by purchase, from Bombay and labelled B fair banks. I also refer to the present species

240 Cerastus distans, Pfeiffer

Bulimus distans, Pfeiffer, P Z S 1856, p 331, ibid, Mon Helic

Viv 1v, 1859, p 409

Buliminus (Cerastus) distans, von Martens, Die Heliceen. ed 2. 1860, p 232, Kobelt, Conch-Cab, Fam Buliminidae, 1902, p 966

Bulumina (Corastus) distans, Pfeiffer & Clessin, Nomencl Helic

Viv 1881, p 286

Cerastus distans, Kobelt & Mollendorff, Nachr Deuts Malak Ges. 1903. p 40

Original description — "T. compresse-umbilicata, ovato-conica, tenuiuscula, costis subarcuatis, chordæforinibus, subdistantibus sculpta, subdiaphana, albida; spira elevato-conica, obtusula; anfr. 7 convexi, ultimus 3 longitudinis subæquans, basi rotundatus; columella profunde subtorta, apertura parum obliqua, acuminato-subovalis, perist tenue, marginibus convergentibus. dextro breviter expanso, columellari dilatato, patente.

"Long 221, diam. 101 mill. Ap. 10 mill longa, 5% lata"

(Pfeiffer)

Hab India Poona (Beildome) Karak I, Persian Gulf (Mus

The present species and C. charbonniers, both as from Karak Island, in the Persian Gulf, were described by Pfeiffer in the same paper, being based upon specimens in the Cuming After a careful examination of the types of both, now in the British Museum, I am unable to separate the two forms specifically, the only differences between them being that charbonniers has one whorl less and is a smaller shell, its dimensions being length 15, diam 8 mm; ap 7 mm. long 45 wide, while the ribs are finer and more crowded It can, at the most, be only regarded as a variety From C abyssinicus it differs in being of a more solid texture, in having a more elongated spire, and in the ribs being more crowded

Although Pfeiffer mentioned only the habitat Karak Island for C distans, von Martens recorded the fact that Albers' collection contained specimens labelled Malabar Providing the latter term be understood in its wider application, as in the case of C malabaricus, there would be no inherent improbability in its occurrence farther north in India and I was, therefore, not surprised to find several specimens from Poona in the Beddome collection which, although erroneously labelled jerdon, were absolutely undistinguishable

from the type of distans. They range in size from 19×10 to 18.5×9 mm. Pfeiffer in describing Bulimus distans alluded to the fact that it differed from B abyssinicus in its more elongated spire and the sculpture.

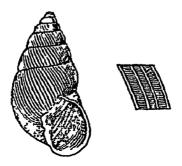


Fig 101 - Cerastus distans Shell 3, sculpture ;

As neither C distans nor C charbonnier has been illustrated before, I add figures of the two from the types in the Cuming collection, with an enlarged view of the sculpture of the former

Var. charbonnieri, Pfeiffer

Bulimus charbonnieri, Pfeisser, P. Z S 1856, p 331, ibid, Mon. Helic Viv iv, 1859, p 410



Fig 102.—Cerastus charbonnieri

Genus RACHISELLUS, Bourguignat

Rachisellus, Bourguignat, Moll Afr Equat 1889, p 68, Thiele, Wiss Ergebn Deuts Zentr-Afr Exp 111, Zool 1911, p 201 Rhachisellus, Connolly, Ann S Afr Mus x1, 1912, p 164

Type, Bulimus punctatus, Anton.

Range. India, Tropical Africa

Shell elongate-oblong, last whorl shorter than the spire, attenuated at the base, umbilical perforation open and deep, more or less covered by the much reflexed columellar margin, the base of the last whorl subangulated around the umbilicus Upper, outer, and basal margins of peristome straight, acute, not thickened or reflected.

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The straight, acute margins of the peristome, giving the shell an Achatmoid aspect, so different from typical Ena, are a character sufficient, in my opinion, to warrant the retention of the group as a separate genus, and I therefore follow Bouromonat's lead in this respect.

The radula closely approximates that of Ena obscura, according A specimen of R punctatus from Tette is reported on by him as follows -- Central tricuspid, very small; laterals. strong, with a large, obliquely truncate central plate: marginals

very abundant, with 7 side cusps.

This genus, established in 1889 by Bourguignat, had been universally relegated to the synonymy of Raches, Albers (Rhaches. Pfeiffer and von Martens), but recently Dr. Thiele † has stated that an examination of the radula of punctatus has satisfied him that this species does not pertain to the latter genus but to Ena in its wider sense. He consequently revives Rachisellus but reduces it to a subgenus of Ena Although von Martens indicated punctatus as the type of the former, at the same time. following in Pfeiffer's tootsters, altering its orthography to Rhaches, Dr. Thiele points out that as this species was not included by Albers in 1850 when the section Rachis was established by him, with Bulimus pallens, Jonas, as first species, the latter must be regarded as type

241 Rachisellus adumbratus, Pfeiffer.

Bulimus adumbratus, Pfeiffer, P Z. S 1854, p 291, ibid, Mon. Helic Viv iv, 1859, p 472, Hanley & Theobald, Conch Ind 1876, pl 148, fig 8

Bulimus (Rhachis) adumbratus, Pfeiffer, Malak Blatt 11, 1856,

p 161

Bulimmus (Rhachis) adumbratus, von Martens, Die Heliceen, ed 2, 1860, p 231. Nevill, Hand List, 1, 1878, p 130, Kobelt, Conch-Cab, Fam Buliminidae, 1900, p 675, pl 102, fig 19

Bulimus adumbratus, Nevill, Enum Helic Ceylon, 1871, p 3
Bulimuna (Rachis) adumbrata, Pfeiffer & Clessin, Nomencl Helic

Viv 1881, p 285

Rachis adumbi atus, Jousseaume, Mém. Soc Zool France, vii. 1894,

Rhachts adumbratus, Kobelt & Mollendorff, Nacht Deuts Malak Ges 1903, p 37

Original description —"T. subobtecte perforata, ovato-conica, solidula, lævigata, albido et roseo adumbrata, strigis distantibus roseo-fuscis el punctis sparsis pellucidis signata; spira conica, apice acuta, nigra; anfr 6 vix convexiusculi, ultimus spira paullo brevior, basi rotundatus, fascia 1 castanea notatus columella subverticalis; apertura obliqua, oblongo-ovalis; perist simplex

^{*} In Mobius, Beitr Meeresfauna Ins Mauritius u Seychellen, 1880, p 340 † Wiss Ergebn Deuts Zentr-Afr Exp in, Zool 1911, p 201

rectum, margine columellari papyraceo, fornicatim reflexo, otrobedua

"Long 20, diam 91 mill Ap 91 mill longa, 6 lata" (Pfeiffer) Hab Cevlon (Neurll)

242 Rachisellus trutta, Blanford

Bulmus trutta, Blanford, J A S B xxxx, 1866, p 42: Pfeiffer, Mon Helic Vit vi, 1865, p. 125, Hanley & Theobald, Conch.

Ind 1874, pl 80, fir 1

Bulmunus (Rhachis) trutta, Nevill, Hand Last, t. 1878, p 131. Kobelt, Conch-Cab, I'nin Buliminidae, 1900, p 668, pl 102, fig 20

Bulinnia (Rechis) tenta, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 255

Ilhachis trutta, Kobelt & Mollendorff, Nachr Deuts Malah Ges 1003. n 30

Original description -- "Shell perforated, conteally orate, thin, finely stricted, light vellowish, with two spiral rows of sub-distant chestnut spots, sub quadrate in form, on all the whorls, and two spiral chestnut stripes, the lower sometimes very faint, upon the last whorl below the periphery. Spire contral apex acute, sutures Whorls 51, convex Aporture nearly oval, slightly Peristome thin, margins united by a thin callus, columpressed oblique mellar margin virtical, narrowly reflexed, the reflexed portion meeting the penultimate whorl at an angle

"Lugth 14, diam 9 millim Aperture 7 mill long, 4) broad'

(Blanford)

Hab India: Anamullar Hills (Beddonie, Blanford)

"There is some doubt whether the shells above described be They have a somewhat immature appearance, but all the specimens sent, four in number, are of precisely the same size, and the thin peristome is characteristic of the group of Bulinus Bengalenus, to which the present species belongs I'rom that species and its allies, it is easily distinguished by its short conical form" (Blanford.)

Most of the specimens of this species I have seen are larger than the type Three shells in the British Museum measure 19×105 mm, two in the Theobald collection 18×10 mm; while hve specimens in the Beddome collection range from 16 × 10 to 125×8 mm, the latter being immature. All possess the two narrow, chestnut, spiral infra-peripheral bands and the two supraperipheral spiral rows of subquadrate spots, referred to in the original diagnosis

The species appears to be confined to the Anamullay Hills, as I have neither seen specimens from any other locality nor traced

any record of such

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243 Rachisellus bengalensis, Lamard.

Bulurus bengalensis, Lamarch, Amm sans Vert. vi, pert 2, 1822, p. 124; Desirors, ibid., ed. 2, vin, 1838, p. 233. Delessert, Recueil Coq. 1841, pl. 28, fig. 4; Pfeiffer, Mon. Helic Viv. u., 1849, p. 194; Reeve, Conch. Icon. v., 1848. Bulumus, pl. 45, fig. 289. Henley & Theobald, Conch. Ind. 1874, pl. 80, fig. 7., ibid., 1875, pl. 148, fig. 6.

Bulimus (Merembrinus) bengalensis, Pfeiffer, Malak Blätt 11, 1856,

p 158

Bulmus (Rhaches) bengalenses, von Martens, Die Heliceen, ed 2.

1860, p. 231.

Buliminus (Waches) bengalensis, Nevill, Hand List, i, 1878, p 1901, Kobelt, Conch-Cab, Fam Buliminidae, 1900, p 668, pl 102, figs 8, 9

Bulimmu (Rachis) bengalensis, Pfeiffer & Clessin, Nomencl Helic.

Viv 1881, p 285

Huliminus (Rachs), bengalensis, Jousseaume, Mém Soc Zool France, vii, 1894, p. 296, Peile, Journ Bombay Nat. Hist Soc vi, 1903, p. 131

Rhachis bengalensis, Kobelt & Möllendorff, Nachr. Deuts Malak Gen 1903, p. 37.

"H. testa ovato-acuta, perforata, tenui, diaphana, glabra, albolutescento, fusco-fasciata, ultimo anfractu subventricoso, hifasciato; auturis linea nigra marginatis; labro subreflexo." (Deshayes)

Long 10 lin

Hab India Bengal (Deshayes); Bombay (Peile); Chittagong (Raban); Raneegunge (Stoliczka),; Chaudernagore, Calcutta, Barrackpore (Nevill, Mainwaring), Bengal and Anamullays (Beddome)

The foregoing brief description may be supplemented as

follows --

Shell perforated, ovate-acute, thin diaphanous, smooth, yellowish-white, usually encircled by two, rarely three, bands, one bordering the suture. Spire conical, apex acute, black. Whorls 6, slightly flattened, the last convex, about equalling the remainder of the shell in height. Aperture spacious, oval, peristome simple, acute, columellar margin dilated.

Long 22, dann 10 mm.

The present species may be distinguished from its nearestally—
R. pretermizis—by its broader base and more conoid spire. It
is, besides, usually paler in colour and is furnished with dense
minute spirals, a feature I have not observed in the other species.
It is thinner in texture than either E pulcher or E adumbratus.
The third and fourth binds are most persistent, but many specimens have the second band represented by a thin line. Seven
specimens from the Anamullays, in the Beddome collection,
labelled pretermism. I refer to bengalensis. The Theobald
collection contains six specimens, labelled Bengal, three of which
are immature and possess four bands; three others have three
bands interrupted transversely, the third becoming entire towards
the aperture

244. Rachisellus prætermissus. Blanford

Bulimus prætermissus, Blanford, J. A. S. B. xxx, 1861, p. 360, Pfeisffer, Mon. Helic. Viv. vi, 1868, p. 131; Hanley & Theobald, Conch Ind 1870, pl 19, hg 4

Buliminus (Rhachis) prætermissus, Nevill, Hand List, 1, 1878,

p 130

Bulimina (Rachis) praetermissa, Pfeiffer & Clessin, Nomencl Helic

Viv 1881, p 285

Buliminus (Rhachis) praetermissus, Kobelt, Conch.-Cab, Fam
Buliminudae, 1900, p 670, pl 102, fig 12

Rhaches practes messus, Kobelt & Mollendorff, Nachr Deuts, Malak. Ges 1903, p 38

Original description .- "Testa perforata, oblongo-conica, tenuis, nitida, striata, luteo-albida, varie rufo vel fusco spiraliter fasciata et transverse strigata, plerumque uni- vel trifasciata, interdum Spira conica, apice acutiuscula plerumque nigra. unicolor albida Anfr. 7 convexiusculi, ultimus & longitudinis subæquans, basi rotundatus. Apertura vix obliqua, subovalis; peristoma simplex, rectum, margine columellari verticali, fornicatim reflexo

"Long 19, diam 10 mm Ap. 8 alta, 51 lata" (Blanford) Hab. India Orissa (Blanford, Stoliczka, Theobald); Sulem district (King); Bengal (Oldham); Bombay (Leith); Madura

Hills (Beddome)

- "This species is intermediate between B. mavortius, Reeve. and B punctatus, Anton, on the one hand, and B. Bengalensis, Lam. on the other It resembles the two first-named in form, but differs from both in the absence of the transparent spots on the whorls It is less solid than B mavortius and broader in muportion to its length the 1 B punctatus. From B. Bengalensis it 18 distinguished by its small mouth and by less tumidity. It varies considerably in marking, of which we have the following
 - "1. Yellowish white throughout; apex the same

"2 Yellowish white with a single brown stripe round the

lower portion of the last whorl; apex white.

"3 Upper whorls transversely obliquely striped with pale reddish lines; last whorl purplish, with a dark brown stripe round the lower portion Apex black

"4 Yellowish white, two pale reddish brown lines round the lower portion of the last whorl, the upper running along the suture above The upper part of the whorls obliquely striped with interrupted streaks of the same colour. Apex black

"5 Three rather broadish and irregular brown stripes around the last whorl; two on the upper ones, becoming purplish black

near the apex, apex black

"6 3 stripes of dark brown on the lower whorl, 2 on the upper Apex black Similar to the marking in B Bengalensis.

"We have no specimens with more than 3 stripes around the last whorl

Bulmun (Raches) pulchen, Pfeiser & Clessin, Nomenci Helic Vir 1881, p 285 Rhaches pulchen, Kobelt & Mollendorff, Nachr Deuts Malak Ges 1903, v 38

Original description:—" Testa ovato-comea, tenuis, albida; fascus tribus purpureo-fuscis ornata, anfractibus convexiusculis Peristomate simplici, labio interiori roseo" (Gray)

Length 23, diam 10 mill Ap 10×6 mill

Hab Ceylon (Gardiner, Benson, Layard); Balapiti (Nevill) India Trichinopoly, Travancore and Tinnevelly (Beddome)

When first described by Gray its habitat was unknown, and it was believed by Pfeisier to be an African species until Benson

sent him authentic Cingalese specimens

The type of Bulimus mavortus, Recve, which is in the British Museum, measures 145×725 mm, and is more slender of spire than pulcher, Gray, so that it is perhaps advisable to distingush this form as a variety. All the specimens possess three bands, one peripheral one below and one above the periphery. The two forms are more solid than any of the other Indian species of Raclusellus The Coming collection contains three specimens, collected by Mr Gardmer, which are more or less speckled and have only two bands, one at the periphery and the other below, agreeing in this respect with the shell figured in Conch Ind as mavorines (copied by Kobelt as pulcher); in addition they me ornamented with a diffused punk internal patch on the columella Another shell in the British Museum also possesses two similar bands, while a second specimen is without bands but has the four apical whorls blackish purple. These measure 22 × 10 mm shells in the Beddome collection are yellowish white, with a few scattered freckles and only one band, the third (infra-peripheral) of a bright pink. Four others, from Travancore, in the same collection, are provided with four bands (two supra-peripheral), the upper one not reaching to the aperture and the other three being more or less interiupted by transverse streaks towards the These bands are all bright pink and the columella is margin similarly coloured. The apical whorls are purplish black, which colour becomes gradually diffused lower down. Lastly, of four specimens from Tinnevelly, also in the Beddome collection, two have the usual three bands and two are provided only with the peripheral and one infra-peripheral band of a chestnut colour

246 Rachisellus punctatus, Anton

Hulumus punctatus, Anton, Verz Conch 1839, p 42, Pfeisse, Mon Helic Viv n, 1848, p 212, Reeve, Conch Icon v, 1849, Bulimus, pl 65, sig 452, Deshayes, in Férussac, Hist Nat Moll n, part 2, 1851, p 86, pl 157, sigs 7, 8, Pfeisser, Conch-Cab, Bulimus, 1854, p 229, pl 62, sigs 22-24, Morelet, Sér Conchyl livr 2 1850, p 68, Hanley & Theobald, Conch Ind 1870, pl 20, sig 10

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> Bulmus (Rhachs) punctatus, Pfeiffer, Malak Blatt. 11, 1856, p 161, Tryon, Struct Syst Conch 111, 1884, p 49, pl 99, fig. 62 Bulmus (Rhachs) punctatus, von Martens, Die Hehceen, ed 2, 1860, p 231, ibid, Malak Blatt vi 1860, p 212, ibid, in von der Decken, Reisen in Ost-Afrika, in, Abth 1, 1869, p 59, Nevill, Hand List, 1, 1878, p 130; Kobelt, Illustr Conchyl Buch, 11 1878, p 273, pl 84, fig 14

> Bulimnus punctatus, von Martens, Nachr. Deuts. Malak Ges 1869, p 153

Bulimus punctatus, Nevill, Enum Helic Ceylon, 1871, p 3

Rhachis punctatus, Schacko, in Mobius, Beitr Meeresfauna In-Mauritius u Seychellen, 1880, p 340 (radula), Smith, Fauna and Geogr. Maldive and Laccadive Arch 1, part 2, 1902, p 143 Bulimma (Rachis) punctata, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 285

Rachisellus punctatus, Bourguignat, Moll Afr Equat 1889, p. 69. Thiele, Wiss Ergebn Deuts Zentr-Afr Exp ni, Zool 1911,

Rachis minctatus, Jousseaume, Mém Soc Zool. France, vii, 1894, v 297.

Rhachts punctata, Kobelt & Möllendorff, Nachr Deuts Malak Ge-

1903. p 38 Buliminus (Rachis) punctatus, Peile, Journ Bombay Nat Hist

Soc x1, 1908, p 131

Bulimus solutus, Benson MS quoted by Pfeiffer and Deshayes

Bulimus solatus, Benson MS quoted by Reeve

Original description .—" Oval-consch, Gewinde massig lang, 6 flache Windungen, wenig glanzend, glatt, weiss, fein braun punctirt, auf der Mitte der letzten Windung ein schmales braunes Band, Wirbelspitze schwarz, glanzend; durchbohrt; Mundung lang oval, Mundsaum scharf, Spindel mit einem Blattchen belegt" (Anton.)

Length 10, diam 5 mm Apert 4.5 mm. long, 3 broad.

Hab. India: Bundelkhund (Benson, Jerdon, Mus Cum.); Oolooberiah, near Calcutta and Benaies (Mainwaring); Madras (Henderson); Poona, Ahmednuggar (Blanford); Trichinopoly, Nullamullays (Blunford); Travancore (Beddome), Olissa (Ball); Bombay Island (Perle, West) Ceylon (Layard, Nevill). Laccadive Archipelago (Stanley Gardines Exp) Africa Zanzibar (Vesco, von der Decken, Brauns); Mozambique Tette and Querimba

Island (Peters); Benguella (Ansorge)

No habitat was given originally by Anton, Benson being the first to identify specimens as B. punctatus from Bundelkhund and Ceylon as recorded by Pfeiffer and Reeve. Many other Indian localities were indicated subsequently by Nevill, while in 1860 yon Martens and Morelet recorded specimens from Zanzibar, the former adding Mozambique in 1869. He mentioned that shells from Zanzibar were contained in Albers' collection, but they were labelled B Perussaci, Dunker, adding that the true West African ferussaci, indeed, scarcely differs from punctatus, except in the white coloration and pale apex He draws attention, however, to the fact that Pfeiffer attributes a corneous apex to punctatue,

whereas the descriptions by Anton and Reeve agree with his specimens from Mozambique and Ceylon in having a black or blackish apex. The specimens from Querimba Island, he states. are somewhat larger-15 mill, long and 7 broad-and are more whitish than those from Tette The shells recorded in 1860 by von Martens were obtained from Herr W. Brauns, an oil manufacturer, who picked them out, together with many other species. from Sesamum seed received in large quantities from Zanzibar. In addition to normal specimens, he observed one form, very conspicuous on account of the width and size of the aperture, the measurements being length 225 mm, may diam 8, length of aperture 7. but which otherwise agreed with punctatus, more especially as regards coloration and markings. Amongst numerous specimens of this species he invariably found but a single distinct band, but frequently in addition some ill-defined band-like shading Agun, in dealing with Il ferusacie, he alludes to its close resemblance to E African and Indian specimens of R munclatus, stating that the latter is somewhat more slender, but differs especially in the last whorl and the aperture, the colouring and marking being similar, although a little darker.

With regard to banding, R punctatus is certainly the most constant, as among the numerous specimens which have passed through my hands, I have not in a single instance observed the one infra-peripheral band missing, but occasionally it is interrupted by the transverse streaks. Now and again there may be an indication of a second band below it, as in some shells from Pulney received by Mr Leman from the lite Robert Cairns' collection. the same may be observed in some shells obtained by the Stanley Gardiner Expedition in S Mables Atoll, Maldite Archipelago. Many specimens from Travancore are strongly marked with transverse fuscous streaks Some shells received by the British Museum from Hutton, from the plains of India, are characterized by a dark rone on the columella. In size R punctatus varies considerably. Hutton's shells measuring 13×6 mm, some Bombay specimens received from A A. West 14.5×55 mm, others from Bundelkhund in the Cuming collection reaching 15×6 mm, and shells from Madras, sent by J. R Henderson, 16×6 mm, while three specimens collected by Pirrie in the Koondah Mountains attain 21 × 9 mm. The latter were labelled B ferusace by Pfeisser. Finally, it appears worth while to place on record three specimens collected in Benguella by Dr. Ansorge, and acquired by the British Museum These can only be distinguished from typical punctata by the larger size—the largest measuring 23×115 mm - and by the more distinctly angulated umbilicus They are creamy white with a pale fuscous infraperipheral band and minute spots

^{*} Jahrb Douts Malak Ges 1x, 1882, p 247

Genus EDOUARDIA (nom. mut.).

Conulnus, von Martens, Nachr Deuts. Malak Ges vvii, 1895, p 180 (section of Buliminus, for B. ugandæ, hildebrandts, and melula, no definition), not Conulina, Bronn, 1835. 1bid, Besch Weichth Deutsch-Ost-Afrikas, 1897, p 64 (as section of Buliminus, type B. conulus, Pferffer)

Type, Bulimus conulus, Pfeiffer.

Range East Africa India (one species)

Rounded conical, with comparatively small last whorl, weak sculpture, generally brown, often somewhat shining, peristome with outer and lower margins straight, columellar margin reflexed, frequently rather oblique in relation to the axis, without fold

Instomy unknown.

The name Conulina, proposed by Bronn in 1835 for a genus of Polyzon, being easily confused with Conulinus, I feel compelled to change the latter and I have associated with the genus the first name of that able malacologist, the late Professor Edouard von Martens, for so many years in charge of the Mollusca section of the Berlin Museum. To this genus I refer the only known species from India, which does not assimilate with any known Indian group, but closely approximates, conchologically, to the African torms. At the outset there is nothing improbable about this distribution of the genus in view of the fact that India and East Africa share, besides, such species as Cerastus abyssmicus, Pupoules compactus, and Zootecus insularis

247. Edouardia orbus, Blanford.

Bulimus orbus, Blanford, J. A. S. B. XX, 1861, p. 361, pl. 1, fig. 14, Pferffer, Mon. Helic. Viv. vi., 1868, p. 150, Hanley & Theobald, Conch. 1nd, 1870, pl. 20, for 1

Conch Ind 1870, pl 20, fig 1

Buliminus (Rhaclus) orbus, Nevill, Hand List, 1, 1878, p 130,

Kobelt, Conch-Cab, Fam Buliminidae, 1900, p 667, pl 102,

Bulimina (Hapalus) or ba, Pfeiffer & Clessin, Nomencl Helic Viv. 1881, p 299.

Original description — "Testa subperforata, oblongo-turrita, cornea, tenuis, oblique striatula, spira conica, apice obligiuscula, sutura impressa Anfi. 7 convexi, ultimus } longitudinis subsequans. Apertura obliqua, rotundato-ovalis, peristoma simpley, rectum, marginibus convergentibus, devtro arcuato, ad anfr. penultimum valde antice porrecto, columellari breviter refleyo, perforationem subtegente

"Long 10, diam 5 mm. Ap 3\frac{1}{4} alta, 2\frac{1}{2} lata" (Blanford)

Hab India Cullygoody, near Trichinopoly (Blanford), Poons

and Ahmednuggar (Blanford, Fan bank)

"We are not acquainted with any Indian type of Bulimus to which the shell can be compared. Its horny texture, elevated,

conical spire, and rounded mouth, with the upper margin of the thin peristome running to a considerable distance forward along the penultimate whork, form a very peculiar combination of

characters" (W T. & H. F Blanford.)

Three specimens in the Cuming collection have 74 whorls, one measuring 135×6 mm, they are dark greyish corneous, and finely obliquely structed. Two shells in the Theobald collection, without locality, have 6½ whorls and measure 9 mm in length, while three others from Ahmednuggar, in the same collection, are pale corneous and measure 135×6 mm. The British Museum possesses, besides, two specimens from Poona, received in 1868 from A. West: these are also pale corneous

Family PUPILLIDÆ.

Genus PUPILLA. Tur ton

Pupilla (Leach), in Turton, Man Land and Freshw Shells, 1831. Pupilla (Leach), in Turton, Man Land and Freshw Shells, 1831, p 99, Beck, Index Moll 1838, p 83 (as subgenus of Pupa), Pfeiser, Malak Blatt ii, 1856, p 176 (as section of Pupa) von Martens, Die Heliceen ed 2, 1860, p 290 (as subgenus), Locard, Prod Malac Française, 1882, p 173, ibid, Coq terr de France, 1894, p 327, Dall, Nautilus, vin, 1904, p 115, Cockerell, op cit vin 1905, p 104, Pilsbry, tom cit pp 105 & 116, Dall, tom cit p 114, Kennard & Woodward, List Brit Non-Marine Moll 1914, p 2

Pupa, Draparnaud, 1801, and subsequent authors (not Pupa, Humphrey, 1797, Bolten, 1798, Lamarck, 1801), Lehmann, Leb Schu Musch Stettins 1873, p 144, pl 14, for 50 (anatomy

Schu Musch Stettins, 1873, p 144, pl 14, hg 50 (anatomy

P muscoi um), Jaminiu, B B Woodward Journ Conch. 1, 1903, pp 354, 360 (not Jamma, Risso, 1826)

Type, Turbo muscorum Lanné.

Range Europe, Asia, Africa

Shell small, shortly cylindrico-ovate, frequently rather solid; spire convex, apex obtuse; whoils compact, the last not or scarcely wider than the penultimate Aperture semi-orate, usually with one or more denticles and occasionally with spiral

Umbilious oblique, narrow

The name Pupa was used almost universally for this genus until, in 1903, Mr. B. B Woodward pointed out that it was not available for this group, when he substituted Jaminia for it Dr. Dall, Prof Cockerell, and Prof. Pilsbry subsequently shed additional light upon the subject, establishing the fact that Jaminia could not be used in lieu of Pupa either, but that Pupilla, first published by Turton in 1831, had to be adopted, and this course was followed by M Louis Germain in Moll. de la France et des regions voisines, ii, 1913, p 184, and by 'Kennard and

Woodward, in their 'List of British Non-Marine Mollusca,' (1914) The name *Pupilla*, had, indeed, already previously been used generically, i.e., by Morse in 1864, and Locard in 1882, but only in its restricted sense for *P. muscorum* and its immediate allies

"Animal usually slender, body attenuated posteriorly, the eyebearing tentacles moderately long, cylindrical, somewhat thickened

at the extremities, the lower tentacles very small

"Jaw (P muscorum) flatly semilunate, with pointed angles, almost horizontal, the convex margin slightly thickened, transparent, whitish yellow, without perceptible striation, very short and narrow

"Radula foliolate anteriorly, stalked posteriorly, ½ mm long, ½ mm wide, with 31 longitudinal and 90 transverse rows of teeth The central tooth equals the lateral in size, is symmetrical, with truncated base and tri-cuspid. The middle cusp is broadly conoid, the side cusps small but pronounced. The laterals become bi-cuspid, and in the outer longitudinal rows comb-like

3-4 cuspid

"The hermaphrodite gland is connected by a filiform winding hermaphrodite duct with the spermoduct. The latter proceeds by the side of the uterus taking up the vas deferens, which is 1.5 mm long and enters the penis distally, the latter being prolonged into a whip-like appendix, 2 mm. long. A short retractor muscle proceeds from the penis below the junction of the latter with the appendix. The penis is cylindrical for 0.5 mm. of its length below the retractor muscle, and close to its entering the cloaca, it is provided with a second whip-like appendix 1.5 mm in length, which is cylindrically dilated below, then becomes filiform, and again dilates, its terminal portion being long club-shaped. The albumen gland is broadly lingulate, short; the uterus broad, with a moderately long vagina into which the stalk of the ovate spermatheca terminates." (Lehmann)

The Indian forms, unfortunately, have not been investigated anatomically, at least nothing has been published on the subject.

Two species—P bi evicostis and P salemenensis—will, I believe, when they come to be examined, be found to differ from typical Pupilla

248 Pupilla muscorum, Linné.

Tw bo muscovum, Linné, Syst Nat. ed 10, 1758, p 767

Helia muscovum, Mullei, Veim Terr Fluv ii, 1774, p 105

Pupa muscovum, Lamaick, Anim sans vert vi, part 2, 1822,
p 111, Deshayes Encycl Méth, Vers, ii, 1830, p 405, ibid,
Anim sans vert ed 2, viii, 1838, p 180, Kustei, Conch -Cab.

Pupa, 1841, p 12, pl 2, figs 1-5, Pfeiffer, Mon Helic Viv ii,
1848, p 311, Hanley, Ipsa Linn Conch 1855, p 352, pl 4,
fig 6, Theobald, J A S B alvii, 1878, p 146, Pilsbry, Naut
v, 1891, p 45

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Pupa marginata, Dripamaul. Tabl. Mell. France, 1801. p. 58, 16 d., Hist. Nat. Moll. I mince, 1805, p. 61, pl. 3, figs. 30-38; Turton, Man. Land & Freshy. Shells British Islands, 1831, p 99

Puvilla marginata (Leveli). Turton, on, cit. p. 92 ias synonym ef

Puva maramata)

Pura (Pup l'a) marginata. Grav 10 Turton, op cit, new edit, 1840. p 196, pl 7, fc 79

Public bodie (Adams) Morse, Journ Portland Soc. Nat. Hist. L. Pupilla rescoura, Morse, ton. cit. p 37, fig 90. (radial)
Pupilla rescoura, Morse, ton. cit. p 37, fig 90.
Pupilla rescoura, Germain Moll. France & Reg. Vois v. 1913.

p 185: Kennard & Woodward, Lut Brit, Non-Marine Moll. 1914. p 8

Shell perforate, subcylindrical, rati er solid, opaque, light brown or yellowish corneous, finely and closely strated. Spire short, spex obtuse, suture moderately deep. Whorls 6-7, increasing slowly and regularly, the last rainer suddenly, slightly convex. Aperture roundly ovate, truncated above; peristome thickened and margins reflexed, with a strong whitish rib or crest externally, the margins approaching and united by a tuin parietal callus, upper margin shortly curved, outer and basil margins rounded, co'umellar margin obliquely ascending, almost straight. The parietal wall is usually provided with a small denticle. Umbilious narrow.

Length 3-325 mm, diain 1.75 mm.

Hab Circumpolar.

Var. asiatica, Mollendorff.

Pupilla miscornar, subsp reaction, Mollerdorff, Ann. Mus Zool. Acad. Imp Sci. St. Petersburg, vi (1901), 1902, p. SSI

'Always toothless, usually more stander, palatal crest less

developed." (Möllendorff)

Hab. India - Kashmir (Wechald): W. Himalayas (Stellerla). Central Asia (Stoliczka, Potarin, Fedtschenko, Przewalski). China (Potanin, Loczy, Mollendorff).

The shells recorded by Theobald as Pupa musccrum, from

Kashmir, probably belong here.

249. Pupilla eurina. Berson.

Pupa eurina, Benson, A M N H. ser. 3, xm, 1864 p. 189; Pfeiffer, Mon. Helic. Viv vi 1868, p 800; Hanley & Theobald. Conch Ind 1875, pl 101, tg. 7.

Pupa (Pupilla) curina, Picifier & Clessin, Nomenci. Helic. Viv 1891, p. 353.

Original description - P testa perforata, ovato-cylindrica, solidiuscula, suboblique structula, rufo-castanea, nitidula; spira ovato-cylindrica, apice obtuso, sutura impressa, submarginata: anfractibus 7-71, convexis, ultimo antice ascendente; apertura 284

semiovata, subobliqua, edeutula; peristomate expansiusculo, albido, margine dextro extus postice incrassato

"Long 21, diam. 1 mill" (Benson.)

Hab India Tribeni Ghat, Nepal (Theobald).

Eight specimens from the Benson collection at Cambridge, sent to me for inspection by Dr. L. Doncaster, agree with the figure of the species in Conch Ind, but the columellar margin is more obliquely ascending than is shown in the figure. They vary in length between 3 and 35 mm. The shell somewhat resembles a large P. serrola.

250 Pupilla seriola, Benson.

Linea seriola, Blanford, J. A. S. B. xxx, 1861, p. 359 (nomnud)

Pupa seriola, Benson, A. M. N. II. ser 3, All, 1863, p. 427, Pfeiffer, Mon. Helic. Viv. vi, 1868, p. 304, Hanley & Theobald, Conch. Ind. 1875, pl. 101, fig. 8

Pupa (Pupilla) seriola, Pfeiffer & Clessin, Nomencl. Helic. Viv.

1881, p 354

Original description - "P. testa vix perforata, ovato-oblonga, subcylindrica, oblique striatula, sericina, flavescente, coi nea; spira oblonga, apice obtususculo, sutura impressa, anfiactibus 5, superioribus convexis, ultimo convexiusculo, antice vix ascendente, apertura subovata, superne angulata, dente 1 parietali mediano remotrusculo induta; peristomatis marginibus callo tenui junctis, dextro vix, columellari superne late expanso

"Long. 21, diam 11 millim" (Benson)

Hab India Orissa, Cuttack (Theobald).

I have not seen this species Judging from the figure in Conch Ind it is allied to P eu ina, Benson.

251 Pupilla diopsis, Benson,

Pupa diopsis, Benson, A M N II ser 3, xii, 1863, p 427, Pfeiffer, Mon Helic Viv vi, 1868, p. 306, Hanley & Theobald, Couch Ind 1875, pl 101, ig 10

Pupa (Pupilla) diopsis, Pfeister & Clessin, Nomencl Helic Viv 1881, p 354

Original description :- "P testa perforata, oblongo-ovata, oblique striatula, striis nonnulis remotis elevatiusculis, sub epidermide cornea albida, spira oblonga, versus apicem obtusiusculum conoidea, sutura impressiuscula; anfractibus 5 convexiusculis, ultimo antice leviter ascendente; apertura oblongo-ovata, superne angulata, bidentula, plica parietali mediana angusta oblique intrante denteque columellari obliquo remoto superne munita, peristomate tenu, margine dextro simplici iecto, columellari expanso

"Long. 2, diam 1 mill" (Benson) Hab India · Nerbudda Valley.

252. Pupilla gutta, Benson

Puna gutta, Benson A M. N H ser 3 xm, 1864, p 138; Pfeisier, Mon Helic Viv vi, 1868, p 298, Hanley & Theobald, Couch Ind 1875, pl. 101, fig 9. Theobald, J A. S B vlvi. 1878, p 146

Pupa (Pupilla) gutta, Pfeiffer & Clessin, Nomencl Helic Viv.

1881, p 353

Orunnal description: -- "P. testa obsolete rimata, oblongo-ovata. lævigata, tenui, pallide cornea, translucente; spira obtuse ovata, sutura impressa; anfractibus 41, convexiusculis, ultimo antice vix ascendente; apertura obliqua, edentula, angulato-rotundata; peristomatis marginibus remotis, dextro recto, acuto, columellari expansinsculo

"Long. 13, diam. 1 mill" (Beason.)

Hab. India Spiti Valley, Kunawui (Benson).

"P. himalayana, Hutton, an elongate and strongly sculptured shell, is the only edentate species previously described from the

Himalayan Region" (Benson.)

I have not seen this species The shell figured in Conch. Ind. does not look as if mature, and the fact that Benson in his diagnosis describes the right margin of the peristome as "straight, acute," makes it appear that the same remark applies to the type It does not seem to have much affinity with Sphyradium himalananum (ante p 41)

253 Pupilla barrackporensis, nom. mut.

Pupa indica, Pfeisier, P Z S 1854, p, 295 (not Pupa indica, Benson, 1849), Pfeisier, Mon Helic Viv iv, 1859, p 679. Hanley & Theobald, Conch Ind 1876, pl 160, fig. 8, Sowerby, Conch Icon xx, 1876, Pupa, pl 7, fig 63

Pupa (Pupilla) indica, Pfeisier, Malak Blatt, n, 1856, p 177

Pfeisfer & Clessin, Nomencl Helic Viv 1881, p 355

Original description: "P. testa breviter rimata, cylindraceoovata, tenui, levissime striatula, oleoso-micante, fulvo-cornea spira apice conoideo-rotundata, anfract 5, superis 3 convexis penultimo planiore, ultimo ! longitudinis formante, basi compresso, antice biscrobiculato, apertura vix obliqua, oblonga, dentibus 4 coarctata · 1 pliceformi parietali, 1 columellari, 2 profundus, brevibus palatalibus; perist albido, breviter expanso

"Long 2, diam 1 mill." (Pfaffer)

Hab India · Barrackpore.

The name Pupa indica, proposed by Pfeiffer in 1854, is not available for the present species having already been employed by Benson in 1849, and I have therefore been obliged to substitute a new one

The McAndrew collection at Cambridge contains several specimens labelled brevicostis, but which I refer without hesitation to the present species, having compared them with the type in the Cuming collection. Nevill, when stating that he considered these

two species identical * may possibly have had specimens of barrachporensis [indica, Pfr, non Benson] labelled brevicostis before him, and was thus misled The two are perfectly distinct as will be seen on comparison of the figures.

254. Pupilla cinghalensis, sp n

Shell narrowly perforate, almost rimate, cylindrical-ovate, rather solid, very minutely striatulate, the earlier whoils corneous, the later ones rufous. Spire convex, apex obtuse, suture impressed Whorls 5, slightly convex, the last flattened and scrobiculate behind the peristome, shortly ascending, slightly compressed and subangulated around the extremely narrow perforation of the umbilicus. Aperture oblique, broadly obovate, furnished with seven denticles 2 compressed, elongate, on the parietal wall, 2 very minute and deeply seated, on the columella, 3 also very



Fig 103 -Pupilla cinghalcusis

minute and deeply scated, on the palatal wall. Peristone rufous, slightly thickened and reflexed, outer margin slightly inflexed, basal margin rounded, columellar margin obliquely ascending and slightly dilated above

Long 2, diam. 1 mm

Hab. Ceylon Type in the British Museum.

This new species is based on a specimen from Ceylon, without piecise indication of habitat, acquired by me some years ago at a sale. It differs from *P barrackpovensus*, its nearest ally, in having seven instead of four denticles in the aperture, and in having the peristome fulvous instead of white

255 Pupilla muscerda, Benson

Pupa musceida, Benson, A. M. N. H. ser. 2, xm, 1853, p. 94, Pfeiffer, Mon. Helic. Viv. iv, 1859, p. 680, Nevill, Enum. Helic. Ceylon, 1871, p. 3, Hanley & Theobald, Conch. Ind. 1876, pl. 160, fig. 2, Sowerby, Conch. Icon. xx, 1876, Pupa, pl. 7, fig. 56

Pupa (Pupilla) muscerda, Pfeiffer, Malak Blatt 11, 1856, p 177; Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 355 Pupa (Vertigo) muscerda, Nevill, Hand List, 1, 1878, p 198.

Original description:—"Testa rimata, ovato-oblonga, striatula, cornea, spira elongata, apice obtuso, anfractibus $5\frac{1}{2}$ -6, convexius-

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culis, ultimo tertiam partem testæ æquante, vix ascendente; apertura ovata, tridentata, peristomate expanso, acuto, marginibus conniventibus, columellari dilatato, albido, plica parietali 1, columellari 1, profundiusculis, dente palatali 1, depresso, obtuso

"Long 4, diam 12 mill" (Benson)

Hab Ceylon: Cape Pedro (Layard); Baticalva (Preston), Jaffna (Linter). India: Erode (Beddome).

"In old posts and on Palmyra trees (Borassus flabelliformis)"

The present species resembles conopicta in shape and contour, but can be readily distinguished by the more acute apex, the slightly inflexed outer margin, and especially by the presence of the teeth in the aperture. In the Beddome collection I found a considerable number intermixed with Pupoides conopicta, collected at Erode. The British Museum contains four specimens from Cape Pedro, which are probably a part of the original lot, as they are accompanied by a label in the late Edgar Layard's handwriting; one of these measures 4.5 mm. in length. There are, besides, six shells presented by Mr. H. B. Preston, who collected them at Baticalva. I have also seen five specimens in the late Miss Linter's collection, now in the Royal Albert Memorial Museum, Exeter, which, with other shells in the same collection, were kindly forwarded to me by the curator, Mr. F. R. Rowley. These measure 4.25 × 2 mm., and are labelled "Jaffina."

256 Pupilla filosa, Theobald & Stohezka

Pupa filosa, Theobald & Stoliczka, J A S B xh, 1872, p 333, pl 11, fig 8, Hanley & Theobald, Conch Ind. 1876, pl, 160, fig 5; Sowerby, Conch Icon. xx, 1876, Pupa, pl. 7, fig 59, Pfeiffer, Mon. Helic Viv vin, 1877, p 401

Pupa (Vertigo) filosa, Nevill, Hand List, 1, 1878, p 196

Pupa (Vestigo (Alaea)) filosa, Pfeiffer & Clessin, Nomenci Helic Viv 1881, p 359

Original description — P. testa ovato-cylindracea, cornea, pellucida, apice obtusiuscula, rimate umbilicata; anfractibus 4½ convexiusculis, sutura simplici junctis, transversim striis cuticularibus, obliquis, filiformibus ornatis; ultimo spira breviore, basi vix angustato, convexiusculo, apertura subquadrangulari, recta, intus dentibus quinque instructa, labro undique paulo expansiusculo, atque incrassato, infra suturam subangulato, ad latus dentibus duobus parvis profunde sitis instructo; labio tenuissimo, prope medium dentibus pliciformibus duobus approximatis, antiore multo minore, prædito; columella unidentata

"Long 2, diam max 1 mm; apert cum perist 0 75 longa antice 0 55, postice 0 75 mm lata." (Theobald & Stoliczka)

Hab Burma Arakan (Theobald)

"A well marked species, both by its peculiarly subcylindrical shape and by the denticulations of the apertural margins; it is not uncommon on the Arakan coast"

288 Pupillidæ

In addition, the strong and close costulation differentiates P filosa from its nearest allies.

257. Pupilla brevicostis, Benson.

Pupa brevicostis, Benson, A. M. N. II ser 2, iv. 1849, p. 127,
 Kuster, Conch. Cab., Pupa, 1852, p. 136, pl. 17, figs. 20-22,
 Pfeifler, Mon. Helic. Viv. in, 1853, p. 560
 Vertigo (Alau) brevicostis, Adams, Gen. Rec. Moll. ii, 1855, p. 172

Vertigo (Alœu) brevicostis, Adams, Gen Rec Moll ii, 1855, p. 172
 Pupa (Vertigo) brevicostis, Pfeisler, Malak Blatt ii, 1856, p. 177,
 Nevill, Hand List, i, 1878, p. 197

Pupa (Pupilla) bi evicostis, Pfeister & Clessin, Nomencl. Helic Viv. 1881. v 355

Original description — "T. 11mato-perforata, cylindraceo-ovata, cornea, apice obtuso, anfractibus 4½, longitudine celeriter crescentibus, ultimo antice non ascendente, ¿ longitudinis festivaquante, superioribus convexis, superne remote semicostulatis, ultimo et penultimo subplanulatis, dunidioque inferiori ceterorum sericeis, mutius, apertura rotundato-ovata, 5-6 plicata, plica 1 augulari, brevi secunda parietali, profundiore, obliqua, columellari unica; palatalibus 2-3 profundis, peristomate expanso, subreflexo

"Long 12 mill, lat. vix 1 mill" (Benson)
Hab India: Bairackpore, Bengal (Bacon)

"Taken by Dr J. F Bacon on the trunk of a tamarind tree at the Cantonment of Barrackpore, near Calcutta, during the rainy season of 1848. Out of several individuals forwarded to me overland, by letter in a quill, two reached me alive, and creeping about when supplied with moisture enabled me to verify their affinities. The lower pair of tentacula is deficient or inconspicuous, as in *Vertigo*, the upper pair carry the eyes at their summits, the shell is often carried at an angle of 45° (Benson.)



Fig 104 -Pupilla hi cercostes 12

Nevill (Hand List, 1, p. 197) was of opinion that Papa indica, Pfeisfer [barrackporensis, mili] and the present species were identical. A comparison of specimens does not bear out this view, as Pfeisfer's species is larger and more cylindrical, the suture is desper, it has half a whorl more, and is provided only with four phase in the apertum.

The figure given by Kuster is not a very good representation of the shell and as this is the only one published I have considered it desirable once more to illustrate the species from a specimen in PUPILLA. 289

the Cuming collection in the British Museum, measuring 1.75×1.1 mm. The type cannot, unfortunately, be found, Dr. Doncaster informing me that a diligent search for it has proved fruitless. The species is characterized by the lamellate

strue and the short spire as compared with the diameter.

The true position of this species is somewhat doubtful Adams, Pfersfer, and Nevill placed it in Vertigo, doubtless owing to Benson's observation that "the lower pair of tentacula is described or inconspicuous, as in Vertigo" As the latter is characterized by the absence of the lower pair of tentacles and Benson does not definitely state that these organs are absent in the species, the reference to Vertigo does not seem warranted, especially since the shell does not, as regards texture, shape, and conformation, assimilate well with the other forms of that genus Pfersfer appears to have modified his original opinion, for in the 'Nomenclator' the species was placed in the section Pupilla of the genus Pupa. While its inclusion in the group of P muscorum is out of the question, brevicostis may be retained in the genus Pupilla in its wider sense, as now understood, until an investigation of its anatomy shall prove the contrary.

258 Pupilla salemensis, Blanford.

Lunea salemensis, Blanford, J. A. S. B. xxx. 1861, p. 359
Pupa salemensis, Pfeiffar, Mon. Helic. Viv. vi, 1868, p. 318; Hanley & Theobald, Conch. Ind. 1876, pl. 160, fig. 9
Pupa salemanensis, Sowerby, Conch. Icon. xx, 1876, Pupa, pl. 7, fig. 62
Pupa (Pupilla) salemensis, Pfeiffer & Clessin, Nomencl. Helic. Viv. 1881, p. 354

Original description:—"Testa rimata, ovato-oblonga, oblique striata, fulvida: spira elevata, conoidea, apice obtuso: sutura impressa, anfr. 4½; superiores convexiusculi, inferiores subplanulati, ultimus pone aperturam medio excavatus, ¾ longitudinis subæquans, antice arcuatim ascendens, juxta suturam et infra compressus. Apertura reinformis; columella recedens, superne callosa Dentes parietales 2 compressi. Peristoma expansum, labio externo flexuose excavato 1 dentato.

"Long. 16, diam. maj 1, apert alt. 06 mm" (Blanford)

Hab. India Kalryen Hills (Foote).

"This little shell belongs to a type distinct from that of Enneu puries and the other S. Indian species, and is more closely allied to the Cuttack sp E seriola. From this it is distinguished by its more considal form and the possession of two well-developed parietal, and one palatal tooth, whereas the Cuttack shell has but one minute parietal tooth. Moreover, the mouth is smaller and more constricted Two specimens were received from Mr. Foote, both somewhat weathered." (Blanford)

Benson states * that it has more affinity with Bulimus In one of the two specimens received by him the parietal lamina was not apparent I have not seen specimens, but to judge from the figure in Conch. Ind. neither Blanford nor Benson appears to me to have been happy in their comparison, as salemensis seems much nearer to brevicostis

Genus BIFIDARIA, Sterki

Bifidaria, Sterki, Nautilus, vi, 1892, pp 4, 99 (as subgenus of Pupa), Pilsbry, Proc Acad Nat. Sci Philadelphia, 1900, p 590 (as genus of Pupidæ).

TYPE, (1st species) Pupa hordeacea, Gabb.

Range. North and Central America, North Coast of South America, West Indies, Bermudas, Eastern Asia, Islands of the Pacific and Indian Seas.

Shell small, few exceeding 3 mm in height, varying in shape from cylindric and turriculate, to come and ovoid. lighter or deeper corneous, chestnut or whitish. Surface smooth, polished, finely striate, or with fine ribs Parietal lamella more or less complex, composed of a parietalis-inner-and supraparietalis—outer, or angular—almost separate, side by side in some species, united to almost a simple one in others, comparatively small in some, the supraparietal very small or almost obsolete in others The columellar lamella, equally constant, is generally also somewhat complex. Typical inferior and superior palatal plicæ always present, sometimes quite small, as a rule deep-seated, never reaching the margin; in some species one or the other is in a peculiar oblique position. Generally, but not always, there is a tooth or short fold at the base. species additional dentiform or lamelliform plice, sometimes very small, are found; one on the parietal wall, between the parietal and the columella, constant or inconstant, one above the upper palatal, one between the two palatals, inconstant. (Sterki)

259. Bifidaria bathyodon, Benson.

Pupa bathyodon, Benson, A M N H ser 3, x11, 1863, p 426, Pfeiffer, Morr Helic. Viv vi, 1868, p. 326, Hanley & Theobald, Conch Ind. 1874, pl 100, fig 7, Sowerby, Conch. Icon xx, 1876, Pupa, pl 4, fig 33, pl 16, fig 152

Pupa (Scopelophila) bathyodon, Nevill, Hand List, i, 1878, p 192

Pupa (Scopelophila) bathyodon, Nevill, Hand List, 1, 1878, p. 192
Pupa (Pupila) bathyodon, Pfeiffer & Clessin, Nomenci Helic Viv.
1881, p. 355.

Original description.—"P. testa profunde rimato-perforata, ovato-conica, oblique striatula, fusco-cornea, translucente; spira

^{*} A M N.H ser 3, x11, 1863, p. 428

conica, apice obtuso, sutura subprofunda; anfractibus 5, convexis, ultime antice ascendente circa umbilicum excavatum compressiusculo: apertura quadrato-ovata, marginibus, expansis subreflexis concoloribus callo parietali expanso superne junctis, 4-dentata, dente parietali I entrante majore, palatalibus 2 minutis remotiusculis. columellari 1 profundo

"Alt 3, diam 2 mill" (Benson)

Hab India Teluk Sendur, near Hoshungabad, not far from the Nerbudda River (Theobald); Mul River, Western India (Theolald)

This appears to be a rare form. I have not seen specimens Benson in his diagnosis rtates that there are four denticles, one being columellar, but the figure in Conch. Ind shows fire, two of which are situate on the columella

200 Bisidaria huttoniana. Benson.

Pupa huttoniana, Benson, A M N H. ser. 2, 1v, 1840, p 126 Pfeisser, Mon Helic. Viv in, 1853, p 550, Hanley & Theobald Conch. Ind. 1875, pl 101, sig 3, Theobald, J A S B xivii 1878, p 146

Pape (Papilla) la Honiara, Adams, Gen Rec. Moll n. 1855.

Pupa (Leioryla) huttomana, Pleisser, Malak Blatt ii, 1850, p 176 Pupa (Vertigo) huttomana, Nevill, Hand List, 1, 1878, p 197

Carychium boynanum, Benson (fide Stoliczka), MS. Nevill, Hand

Last. 1, 1878, p 197

Pupa (Vertigo (Alaca)) huttomana, Pfeisser & Clessin, Nomencl. Helic. Viv. 1681, p 358

Original description -" Testa rimata, ovato obliqua, subcylindracea, hvalina, glabra, apice obtuso; anfractibus 5, convexis; apertura ovato-rotundata, quinqueplicata; peristomate expansiusculo, marginibus callo tenui junctis, plica unica irregulari, sinuata, parietalis, columellaribus duobus, palatalibus duobus profundis

"Long 11 mill, lat. vix 1 mill." (Benson)

Hab India Simla (Hutton), Sind (Blanford); Knehmir and Deccan (Stoliczka), Ahmednuggar (Theobald), Wadalé (Fair-

bank); Kashmir Panjal Range (Theobald)

Some shells from Simla in the Theobald collection are referred here with some doubt The parietal plica is bifid and in some specimens there is an additional plica nearer the columella: others have only one columellar plica. The shells range in length from 1 75 to 2 mm. A number of himalayana from Simla, presented to the British Museum by Hutton in .1856. comprised a specimen of huttomana The Beddome collection also contains ten shells of huttomana collected in Kashmir by Stoliczka, these have likowise a bind parietal plica, while a single columellar plica occurs in some and two in others

261. Bifidaria avanica. Benson.

Pupa avanica, Benson, A. M. N. H. ser. 3, xii, 1863, p. 428, Blanford, J. A. S. B. xxxiv, 1865, p. 95, Pfeiffer, Mon. Helic Viv vi, 1868, p. 335; Hanley & Theobald, Conch. Ind. 1876, pl. 160, fig. 7, Sowerby, Conch. Icon. xx. 1876, Pupa, pl. 7, fig. 60
Pupa (Vertigo) avanica, Nevill, Hand List, i, 1878, p. 197
Pupa (Pupilla) avanica, Pfeiffer & Clessin, Nomencl. Helic Viv. 1881, p. 356

Original description:—"P. testa umbilicata, ovato-oblonga, subcylindrica, vix striatula, niida, fusco-cornea, translucente; spira oblonga, versus apicem obtusiusculum conica, sutura valde impressa; anfractibus 5½, subconvexis, ultimo antice ascendente; apertura ovata, superne obtusa sexdentata, plica parietali 1 duplicata, intrante, dentibus columellaribus 2 profundis et palatalibus 3 profundis munita; peristomate undique expanso, marginibus tenuibus callo parietali lato junctis.

"Long. 21, diam. 11 mill" (Benson.)

Hab. Burma: Ava (Theobald); Mandalay (Blanford).

The species is characterized by the very convex whorls and the deep suture, resembling mimula in that respect, but it is more conoid and the last whorl becomes more contracted, while in mimula the aperture is more rotundate. A specimen in the Hungerford collection in the British Museum shows a slight additional parietal denticle nearer the columella. A shell in the Beddome collection has only two palatal places.

262. Bıfidaria mimula, Benson.

Pupa minula, Benson, A. M. N. H. ser. 2, xii, 1853, p. 95, Pfeisfer, Mon Helic Viv iv, 1859, p. 676, Nevill, Enum. Helic Geylon, 1871, p. 3, Hanley & Theobald, Conch. Ind. 1876, pl. 160, fig. 4, Sowerby, Conch. Icon. xx, 1876, Pupa, pl. 7, fig. 61.
Pupa (Leiostyla) minula, Pfeisfer, Malak. Blatt. ii, 1856, p. 176
Pupa (Vertigo) minula, Nevill, Hand List, i, 1878, p. 198
Pupa (Vertigo (Alaea)) minula, Pfeisfer & Clessin, Nomencl. Helic. Viv. 1881, p. 358

Original description:—"Testa rimata, ovato-oblonga, subcylindracea, oblique tenuiter plicatula, pallide cornea, apice obtuso, sucura profundiuscula; anfractibus 5, convexis, ultimo vix ascendente; apertura ovata, verticalis, 5-plicata, peristomate tenui, expanso, marginibus callo tenui expanso junctis, plica 1 intrante, majuscula, parietali, 1 columellari, 1 basali profunda, 2 palatalibus profundis.

"Long. 2, diam. 1 mill." (Benson.) Hab. Ceylon: Cape Pedro (Luyard).

"Nearly allied to and somewhat larger than the Himalayan

P. huttoni, Nobis" (Benson)

A well-characterized form. The parietal lamella is compressed and largest of all, the columellar one being somewhat smaller, while the three palatals are very minute. I have seen four specimens in the British Museum, recently acquired by purchase, which are from Cape Pedro, and are accompanied by a label in the late Edgar Layard's handwriting; they are in all probability some of the original lot. There are, besides, three shells in the Hungerford collection and eight in the Theobald collection, so that the species appears fairly common.

203. Bifidaria serrula, Benson

Pupa terrula, Benson, A. M. N. H. ser 3, xii, 1863, p. 427, Pfeiffer, Mon Helic. Viv. vi, 1868, p. 319
Pupa (Vertigo (Alaca)) terrula, Pfeiffer & Clessin, Nomencl. Helic.
Viv. 1891, p. 358

Original description:—"P. testa rimata, ovato-conica, oblonga, oblique subcostulato-striata, albida; spira elongato-conica, apice obtuso; sutura profunda crenulata, anfractibus 5, superioribus valde convexis, ultimo antice ascendente; apertura quadrato-ovata, sexdentata, lamina parietali 1 subduplici, columellari 1 superiore denteque minuto inferiore, dente minuto basali; palatali 1 superiore laminaque inferiore profunda munita; peristomate undique expanso, margimbus tenuibus callo lato superne junctis.

"Long 2, diam 3 mill." (Benson)
Hub. India Central India (Theobald).

Is stated by Pfeiffer to be similar to P. mimula. I have not seen any specimens; the type, like so many other of Benson's shells, having apparently gone astray. It appears to be a rare species

Genus BOYSIDIA, Ancey

Boysidia, Ancey, Le Naturaliste, No 47, 1881, p 373 (as section of Pupa)

Gredleriella, Müllendorff, Jahrb Deuts Malak. Ges xi, 1884, p 179 (for Pupa hunana)

Bensonella, Pilsbry, Proc. Acad. Nat. Sci Philadelphia, 1900, p. 591, footnote

Type, Pupa dorsata, Ancey.

Range India, Farther India, China, Malaysia.

Shell minute, rimate, conoid, with closely coiled, convex whorls, last whorl ascending in front, dilated towards the aperture, turned below. Aperture armed with several place or lamelle. Peristome continuous.

Anatomy unknown

Ancey, in describing Pupa dorsata, from China, stress that it pertains to the Asiatic group of P. plicidens. He proceeds:—"Benson found a certain resemblance or rather established/a connection between these forms and the species of a certain group (Boysia), equally peculiar to Asia. These Papas appear to me to constitute a distinct section, which I propose to name Boysidia, on account of the resemblance to the genus referred to."

Prof Pilsbry in proposing the subgenus Bensonella in 1900, with Pupa plicidens as type, seems to have ignored the fact that Ancey had already included the species in the section Boysidia, established for the reception of Pupa donsata, for he makes no allusion to it, although on the next page he reduces Boysidia to a subgenus under Hypselostoma, a procedure in which I am unable to follow him, for I believe a greater affinity exists between plicidens and hunana than between the latter and the genus Hypselostoma

Besides the two species referred to, some other Chinese forms belong here, i e Pupa hunana, Gredler*, P. strophostoma, Mollen-

dorff t. P. angulina. Gredler 1.

264. Boysidia plicidens, Benson.

Pupa pheadens, Benson, A. M. N. H. ser. 2, 1v, 1849, p. 126, Kuster, Conch.-Cab., Pupa, 1852, p. 136, pl. 17, figs. 23, 24, Pfeiffer, Mon Helic Viv. in, 1853, p. 553; Hanley & Theobald, Conch. Ind. 1874, pl. 100, fig. 8, Sowerby, Conch. Icon. xx, 1876, Pupa, pl. 16, fig. 151

Vertigo (Odontocyclas) pheidens, Adams, Gen. Rec Moll 11, 1855,

p 178

Pupa (Scopelophila) plicidens, von Martens, Die Heliceen, ed 2,

1860, p 296

Assam (Godwin-Austen)

Pupa (Scarabella) plicidens, Pfeiffer, Malak Blütt. n., 1876, p. 175 Pupa (Odontocyclas) plicidens, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p. 350

Pupa (Boysidia) plicideits, Ancey, Le Naturaliste, No 47, 1881,

p 373

Bifidaria (Bensonella) plicidens, Pilsbry, Proc Acad Nat Sci Philadelphia, 1900, p 591

Juv ? = Hydrocena milium (Benson), Godwin-Austen, P.Z S 1872, p 515, pl 30, fig. 3

Original description:—"T' umbilicata, ovato-conica, subtrochiformi, glabriuscula, obscure striata, cornea; anfractibus quinque convexis, ultimo ventricoso, antice ascendente, ad basin tumido; sutura impressa; apice obtuso; apertura irregulari subtriangulari, 9-plicata; peristomate continuo, sinuato, expanso, marginibus callo appresso expanso junctis. dextro medio extus impresso. intus tuberculato-incrassato; plicis parietalibus 3, quarum 2 superioribus elongatis, columellari dentiformi, unica, palatalibus 5, quarum 2 sub-basalibus, minutis; margine basali extus callo prædito; umbilico angusto

"Long. 2, lat 1½ mill.' (Benson.)

Hab. India: Landour (Hutton); Mussoorie; Cherra Poonjee,

^{**} Gredler, Jahrb Deuts Malak. Ges vin, 1881, v 23, pl 1, fig 5, Hende, Moll. Terr. Vall Fl Bleu, 1882, p 76, pl 18, fig 25
† Jahrb Deuts Malak. Ges xii, 1885, p 395, pl. 11, fig 23
† Conchyl Fauna von China, vin, 1885, p 7

"This shell is very peculiarly formed, and seems to indicate the transition from Pupa to Anostoma The animal has four tentacula, the superior pair bearing the percipient points or eyes, the inferior very short. The foot is hyaline, the tentacula and neck fuscous The shell is carried horizontally." (Benson)
The only known Indian form of this genus It somewhat re-

sembles Hupselostoma bensoni, but is more conoid, the umbilicus is a mere puncture, too small even to admit a bristle, and the last whorl is much less dilated towards the aperture Of the three parietal lamelle, the two principal ones are deeply entering; the upper or outer runs as far as the margin of the peristome, the second is compressed, much more elevated anteriorly, being triangular, and terminates a little further from the peristome; the third (inner) or infra-parietal is very small and deep-seated. The palatal denticles are rather deep-seated, elongated, compressed, and usually five in number, the three upper largest, the other two basal, minute, especially the fifth, another compressed elongated denticle occurs on the columella. All these are distinctly visible through the shell-wall from the outside addition there is a small conical denticle on the edge of the outer margin of the peristome, with a corresponding scrobiculation on the outer side. This latter feature is not mentioned by Benson.

The species appears fairly common, for the British Museum possesses forty specimens from Mussoorie presented by Hutton, fifteen specimens from Landour, and in the Theobald collection there are seven shells from Cherra Poonsee The McAndrew

collection also contains a considerable number

265 Boysidia salwiniana, Theobald.

Pupa salwiniana, Theobald, J A S B xxxix, 1871, p. 400; Hanley & Theobald, Conch. Ind. 1874, pl. 100, fig. 9, Sowerby, Conch. Icon. xx, 1876, Pupa, pl. 16, fig. 150, Pfeisfer, Mon. Helic. Viv. vin., 1877, p. 403

Pupa (Scopelophila) salwiniana, Nevill, J A S B xlvi, 1877, p 23; ibid., Hand List, i, 1878, p 192, ibid, in Anderson, Zool Res. Two Exp W Yunnan, 1, 1879, p 882

Pupa (Pupilla) salwiniana, Pfeisser & Clessin, Nomencl Helic Viv

Pupa salicineana, Godwin-Austen, P Z S 1888, p 244

Original description .—" Testa pyramidata, rimata, fusco-cornea, epidermide lævi induta; anfractibus 6, convexiusculis, sutura impressa junctis, ultimo ad aperturam breviter ascendente, apertura rotunde oblonga, parum dilatata et tertiam longitudinis superante, dentibus quinque, albidis instructa dente primo parietali magno, lamellari, inediano, alteroque parietali minimo juxta suturam posito, tertio parvo umbilicum juxta, quarto quintoque in labro submediano et ad basin sitis, modicis, æquidistantibus, labro simplici, non reflexo

"Long. 16 [=4 mm.], lat. 09 [=2.25 mm.], aperture alt ·06 unc. [=1·25 mm.]." (Theobald.)

Hab. Burma Shan States (Fedden): Bhamo (Anderson).

Pingoung, Shan Hills (Godwin-Austen)

Theobald states that the species resembles P. bathyodon, Benson, but is more acuminately and regularly pyramidal. I have not seen bathyodon, but to judge by the figures in Conch. Ind. the comparison is not a happy one B. salwiniana appears to me to assimilate rather with plicidens. The spire, however, is more attenuated, and the shell is about twice as large. There is also an inflection of the right (outer) margin of the peristome, which is continued as a horizontal superficial groove on the outer wall. corresponding with an elongated horizontal fold on the inside of the right margin, a feature which still further tends to connect this species with plicidens, and induces me to place it in the genus Bousidia.

Two specimens in the Beddome collection (British Museum), labelled Burma, are rather larger than the type, measuring

 5.2×3.5 mm. including the peristome.

Godwin-Austen, who records it from Pingoung, Shan Hills, at an altitude of 2500 feet, mentions that the only perfect specimen found was bleached, but a smaller imperfect one was covered with a brown epidermis. He calls it a very beautiful little shell, which undoubtedly it is.

Genus BOYSIA, Pfeiffer.

Boysta, Pfeifier, Zeit. Malak vi, 1849, p 105, ibid, Mon Helic Viv. in, 1853, p. 528, ibid., Conch.-Cab. Helia, n, 1853, p. 6, Adams, Gen Rec. Moll ii, 1855, p. 167, Nevill, J A. S. B l, 1881, p 128; Pfeiffer & Clessin, Nomencl Helic Viv 1881, p. 343.

Hypostoma, Albers, Die Heliceen, 1850, p 130 (non Hypostoma, Rudolphi, 1809, Vermes, non Hypostoma, auct. (Hypostomus, Lacepède, 1803), non Hypostoma, Gray, 1841, Echinod)
Hypotema, von Martens, Die Heliceen, ed 2, 1860, p. 304 (nom.

mut as section of Pupa).

TYPE, B. boysi. Pfeiffer.

Range. India

Shell globose-conoid, thin, rimate, last whorl arcuately ascending; aperture oblique, directed upwards, subrotundate, continuous, edentulate

Anatomy unknown.

The only known species of this genus has had a somewhat checkened career. Described originally by Pfeiffer in 1846 as Tomogeres boysu (evidently a misprint for Tomigerus), it was in 1847 transferred by the same author to Anostoma, both the generic and specific designation being apparently suggested by Benson, who published the name in 1848 Pfeisier having arrived at the conclusion in 1849 that the species could not be retained in Anostoma, created the genus Boysia for its reception

297 BOYSIA.

placing it near Puna. At the same time he altered the specific name to bensons, to do which he had no right and for which, moreover, there was no need Curiously enough, with one exception, every subsequent author who has referred to the species has acquiesced in this arbitrary procedure In 1850. Albers, unaware apparently that Pfeiffer had already proposed a new genus, introduced Hypostoma, placing it between Anostomic and Tomigeries. The name having already been employed in three different classes in zoology, von Martens, in 1860, altered it to Hupotiema, at the same time reducing it to a section

In 1867 Stoliczka described a fossil shell, from a cretaceous fresh-water deposit in the North-Eastern Alps, under the name of Boysia Reussis. Nevill in referring to this fossil + states that it is a well characterized form and considers, judging from the

figure, that it is possibly correctly referred to Bouma

With all due deference to the weighty opinion of so eminent a naturalist as Stoliczka or that of Nevill, I do not think the association of two such different forms in one genus a very happy one. The recent Indian shell has the aperture on the same level as the penultimate whorl, forming not a rectangle but a very acute angle, and on the last whorl the mouth is vertical, whereas the European cretaceous shell has the mouth inclined at a very acute angle. Sandberger certainly had a much truer perception of its affinity. I believe, when he referred the fossil to the genus Strophostoma 1.

Quite recently Professor Cockerell has also referred two Tertiary species from Wyoming, USA, to the genus Boysta & One of these, B phenacodorum, to judge from the figure, bears a striking resemblance to the Indian recent species I am inclined to think, however, that this is simply a case of convergence another closely allied form he creates a new genus, Protobogma.

266 Boysia boysi, Pfeiffer.

Tomogeres boysu (Anostoma) (Benson), Pleisfer, Symb Hist, Helic m, 1846, p 82

Mnostoma boysu (Benson), Pfeisfer, Mon Helic. Viv 1, 1847, p 2; Benson, A M N H ser 2, 11, 1848, p 104.

Boysu benson, Pfeisfer, Zeit. Malak vi, 1849, p 105, ibid, Conch-Cab, Helia, 11, 1853, p 6, pl 101, figs 25-28; Adems, Gen Rec. Moll 11, 1855, p 167, pl 76, fig 2, Pfeisfer, Malak. Blatt. 11, 1856, p 172, Hauley & Theobald, Conch Ind. 1870, pl. 8, fig. 1, l'feisfer & Clessin, Nomencl Helic Viv. 1881, p 343, Tryon, Struct Syst Conch 111, 1884, p 56, pl 100, fig 98

Hypostoma boysu. Albers. Die Heliceen, 1850, p 130

Hypostoma boysu, Albers, Die Heliceen, 1850, p 180 Pupa (Hypotrema) boysu, von Martens, Die Heliceen, ed 2, 1860, p 305

^{*} Sitz-Ber K Akad Wiss Wien, xxxviii, 1859, p 493, pl 1, fig 17 † J A S B l, 1881, p 128 † Hand- und Sussw Couch Vorwelt, 1871, p 80, pl 3, fig 12 Bull. Amer Mus Nat Hist New York, xxun, 1914, p 324

Pupa (Boysia) bensoni, Nevill, Hand List, i, 1878, p 194 Boysia boysii, Kobelt, Illustr. Conchyl Buch, ii, 1878, p. 278. pl 85, fig 10.

Original description - T. arcuato-rimata, compresso-conica, tenuis, lævigata, diaphana, pallide cornea; spira oblique conoidea, obtusiuscula: anfr. 5 convexi. ultimus arcuatim ad marginem superiorum antepenultimi ascendens, apertura subtriangularirotundata, edentula; perist. subsimplex, expansiusculum, marginibus lamina breviter soluta junctis.

"Diam maj 3½, alt 3 mill" (Pfeiffer)

Hab. India Chittore, Rajputana, and Azmere (Boys); Nerbudda

Valley (Nevill, Stoliczka)

The Cuming collection contains two specimens from Bengal, while there are some shells from Mandata, on the Nerbudda, in the Theobald collection. The latter are smaller than the type, their dimensions being .- major diam 25, minor 2, alt 25 mm

Genus HYPSELOSTOMA, Benson

Tanystoma, Benson, A. M. N. H. ser 2, xvn, 1856, p. 130

Hypselostoma, Benson, tom cit p. 342 (nom. mut), Fischer, Man.

Conchyl 1885, p. 478, Pilsbry, Proc. Acad. Nat. Sci. Philadelphia, 1900. p. 592

TYPE, Tanustoma tubiferum, Benson.

Rance. Burma, Farther India, China, Malaysia, Philippine

Islands, and Loo Choo Archipelago

Shell deeply umbilicate, depressed, conoid, whorls few, the last solute, twisted; aperture oblique or horizontal on a level with the apex, denticulate

Anatomy unknown.

A peculiar genus of Mollusca, the type of which is, as Prof Pilsbry aptly observes, one of the most extreme modifications and not a fair criterion. He considered the genus rather nearer to Nesopupa and even Torquilla than to Bifidaria

Burma has produced three species, the other two, unlike the type, having the aperture but slightly oblique, almost vertical, instead of horizontal, in a plane with the apex.

267. Hypselostoma tubiferum. Benson.

Tanystoma tubiferum, Benson, A. M. N. H. ser 2, xvii, 1856, p. 130
Hypselostoma tuberiferum, Adams, Gen. Moll. ii, 1858, p. 640,
pl. 138, fig. 4, l'feisfer, Novit Conch. ser 1, 1, 1860, p. 130,
pl. 36, figs. 1-4, Blanford, J. A. S. B. xxxii, 1863, p. 326,
Stoliczka, J. A. S. B. xl, 1871, p. 173, pi. 7, fig. 1 (animal),
Hanley & Theobald, Conch. Ind. 1870, pl. 8, fig. 3, Kobelt,
Illustr. Conchyl. Buch, ii, 1878, p. 278, pl. 85, fig. 44, Tryon,
Struct. Syst. Conch. iii, 1884, p. 56, pl. 100, fig. 99, Cooke,
Cambr. Nat. Hist. iii, 1895, p. 302, fig. 202 A.
Pupa (Hypselostoma) tubifera, Nevill, Hand List, i, 1878, p. 193

Original description .- "Testa depresso-conoidea, radiato-striata,

conica, sutura excavata, spira breviter conoidea, apice obtususculo; anfractibus 3, convexis, ultimo tubam protractam, sursum tortam, altiorem quam apice, efformante, ad periphæriam valide et obtuse carinato, superne baltea tumida, a periphæria sulco profundo separata, munito, subtus convexo, margine umbilici aperti perspectivi angulato, angulo usque ad aperturam extendente; apertura horizontali sursum spectante, 6-7 dentata, dentibus lamelliformibus durbus parietalibus, supera validiori duplicata, inferiori minore profunda, 1 columellari mediocri, 4 palatalibus quarum superiori duplicata tertiaque majoribus; peristomate libero, valde expanso, reflexiusculo

"Diam. may 4, min 3, axis 2 mill." (Benson.)

Hab Burma. Thyet Mio (Blanford, Theobald, Oldham); Mya Leit Doung, Tsngyen Hills, and Pegu as far south as Henzida

(Blanford).

The animal of *H. tubiferum* has been observed both by Blanford and Stoliczka. The latter gave a figure and described the specimens seen as "pale grey, they had the eye pedicles rather more elongated than usually in species of *Pupa*, and more resembling those of *Helin*; the tentacles at the base of the rostrum were very minute, both blackish. The rostrum itself is thick and very minutely notched at the front edge. The foot is short, ovately elongated, roundly truncate posteriorly. The animal, when moving, carries its shell in a reverse position. On the whole it greatly resembles that of *Anostoma*, as figured by Fischer in Journ, de Conch. for 1869, vol. 1x, pl. xi, figs. 1, 2."

Hypselostoma tubiferum is the largest and most depressed of the Burmese forms of the genus. It is, moreover, readily separated from its congeners by the aperture being horizontal and on a level with the spire. The parietal entering lamella are sometimes bidentate. The species appears to be fairly common and occurs in many collections. Some specimens in the Cuming and Theobald collections are somewhat larger than the type, measuring

major diam 4 25, minor 3 10, alt. 3 5 mm.

268 Hypselostoma bensonianum, Blanford.

Hypselostoma beneomanum, Blanford, J. A. S. B. xxxii, 1863, p. 326, Pfeiffer, Mon. Helic. Viv. v, 1868, p. 437, Hanley & Theobald, Conch. Ind. 1870, pl. 8, fig. 2, Pfeiffer & Clessin, Nomencl. Helic. Viv. 1881, p. 344

Pupa (Hypselostoma) bensom, Nevill, Hand List, i, 1878, p 193

Original description —"Shell moderately umbilicated, turbinate, not distinctly stricted, thui, horny—Spire conical, apex papillar and with the axis oblique, suture deep—Whorls 4, the upper ones flattened, the last bulging below the suture, and again at the periphery (where it bears a prominent rounded keel), rounded beneath, and compressed towards the umbilicus. It rises somewhat towards the mouth, which is round, nearly vertical, slightly turned upwards, free from the other whorls, and furnished

miside with 5 lamellar teeth, 4 of which are equidistant and opposite to each other, at the upper and lower corners of the mouth, so as to form a partial St Andrew's cross, while the fifth, which is smaller, is close to and above that at the upper corner of the parietal margin. Peristome free, simple, broadly expanded and trumpet-shaped." (Blanford)

Major diam. 3, minor 22, alt. 2 inm. Diam of peristome

1 mm.

Hub. Burma. Mya Leit Doung, Ava (Blanford, Oldham).

"The differences between this shell and Hupselostoma tubiferum, Benson, hitherto the only known species of the genus, are That shell has the spire scarcely exserted, while the last whorl ascends so much that the mouth which is horizontal, is on a level with the apex. In the present species the spire is conical, the mouth nearly vertical, and the last whorl only ascends very slightly In H. tubiferum also, there are more teeth in the mouth, they are situated further back from the aperture, and are somewhat differently disposed, the upper two lamellæ being produced in front of the others, and forming an imperfect tube There are also minor differences in striction, umbilicus, etc. Nevertheless the general appearance of the two species is strikingly similar, and the peculiar shape of their whorls and mouth recalls those of the Brazilian genus Anostoma, Lam" (Blanford)

Some specimens in the Theobald collection measure major

diam 3, min. 2, alt. 2 mm. (including the peristome).

269. Hypselostoma dayanum, Stoliczka.

Hypselostoma dayanum, Stoliczka, J. A. S. B. xl, 1871, p. 172, pl. 7, fig. 2, Hanley & Theobald, Conch. Ind. 1876, pl. 147, fig. 10, Pfeiffer, Mon. Helic. Vzv. vii, 1876, p. 488, Pfeiffer & Clessin, Nomencl. Helic. Viv. 1881, p. 344
Pupa (Hypselostoma) dayana, Nevill, Hand List, 1, 1878, p. 193.

Original description — "Hypselostoma testa minuta, considea, solidula, pallide brunnea, apice obtusiuscula, late profundeque perspective umbilicata; anfractibus 4, convexis, suturis profundis sejunctis, primo lævigato, submammillato, ceteris striis incrementi subobsoletis notatis, ultimo maximo, fere plane voluto, supra ad peripheriam subangulato, deinde sensim angustiore et ad marginem umbilici rursus obtuse angulato; apertura fere verticali, vix descendente, conspicuiter dilatata, subcirculari, marginibus junctis, intus crassiusculis et plicose dentatis; labio adnato modice expansiusculo, bidentato, dente superiore majore, labro six-dentato, dentibus duobus in regione columellari sitis subdistantibus, alteris duobus, in margine externo, similariter inter se remotis, sed duobus in marg. basali sitis approximatis, parvis

"Diam maj 11, d min 08, altitudo 1 mm"

Hab. Burma · Damotha near Moulmain (Stoliczka.)

"It is the third known species of the genus In general form

it resembles Blanford's *H Bensonianum* from near Ava, but differs in the shape of the last whorl, and in the dentition of the aperture. The latter is in both species almost vertical, not turned entirely upwards, as in the type of the genus, *H tubiferum* As regards form, the present species indicates still more distinctly the affinities of *Hupselostoma* to *Pupa*, than does *H. Bensonianum*." (Stoluzka)

In addition to the fore-mentioned differentiating characters *H. dayanum* may at once be distinguished by its smaller size, being the smallest member of the group. It appears to be a rare

species and I have not seen any specimens.

Family CLAUSILIIDÆ

Genus CLAUSILIA, Draparnaud

Clausilia, Draparnaud, Hist Nat. Moll Terr Fluv France, 1805, pp 24, 29; Stoliczka, J A S. B xl, 1871, p 173 (anatomy), Boettger, Palmontogr 3rd Suppl 1877, ibid., 17 & 18 Ber Offenbacher Ver Naturw 1878, Mitt p 18, Wiegmann, Jahrb Deuts. Malak Ges v, 1878, p 157 (anatomy)

Type, (first species) Tui bo bidens, Linn.

Range. India, Ceylon and Nicobars, Farther India, China, Japan. Malay Archipelago; Asia Minor; Northern Africa,

Madeira, Europe, South America and Porto Rico

Shell sinistral in the great majority of species (invariably so in the Indian forms), cylindrical or fusiform, more or less solid, usually striated or ribbed transversely, generally more strongly so behind the aperture, spire usually turreted, with acute or obtuse apex: aperture small, usually pear-shaped, sometimes subquadrateorate, sometimes with a sinus at the upper angle, provided with two spiral entering folds usually on the parietal lip, the lower sometimes on the outer lip, both continued internally as far as the seat of attachment of the pedicle of the clausilium; the upper follows the spiral convolution of the columella and becomes the columellar fold (inferior lamella of Pfeiffer); a second fold further back, known as the subcolumellar (columellar of Rossmassler) fold. its termination sometimes visible from the aperture; these two folds form a long flexuous groove, slightly dilated towards the aperture, but further down becoming again contracted addition there is a curved flexuous, tongue shaped, elastic plate, known as the clausilium, which higher up becomes contracted into a narrow twisted pedicle, its distal extremity attached to the inner shell-wall, between the distal extremities of the columellar and subcolumellar folds, the groove between these, lower down, receiving the clausilium as it is pushed to one side by the animal's extrusion. In addition to these processes there are a varying

number of palatal plice behind the aperture, and usually showing through the shell-wall. In some species two of these plice have their posterior extremities curved and approximating, ultimately uniting and forming the so-called lunella. Peristome continuous. Umbilicus usually very slight, and consisting of a narrow, oblique slit behind the columniar margin.

"The animal of Cl. philippiana is black with a greenish tinge on the posterior part of the body, which is covered with rather coarse warts; the pedicles are moderately elongated, pinkish, slightly swollen at the tips which bear the small eyes centrally; tentacles very short, but distinct, foot moderately elongated.

strong, posteriorly obtusely pointed

"The mantle has a free entire edge, and is internally somewhat thickened, especially on either side of the pulmonary orifice. At the place of the labial fold the edge is simply grooved. Corresponding to the columellar rib the groove is much stronger and deeper, extending with free raised edges to the mantle-margin. The lower (or anterior) of these lamellar edges is semicircularly enlarged, and towards the end folded over; it secretes the columellar fold, with its internal laminar projection for the support of the clausilium. The upper (or posterior) edge is smaller and evidently secretes the clausilium; it becomes folded over the former when the animal protrudes out of its shell.

"As regards the internal structure there is nothing very

distinct from the anatomy of the HELICIDE

"The pulmonary cavity is narrow and long, the mantle forming it being rather thick and of a deep pinkish black colour. The kidney is of a large sub-triangular form, and one portion of it almost entirely envelopes the heart. The mouth is small and the salivary glands he immediately behind it, covering the anterior part of the alimentary canal, while in most Heliotox they are on long peduncles and situated at the lower anterior base of the stomach. The oral parts and the salivary glands are pinkish grey. The intestines make only a slight bend, and the rectum is accompanied by a very narrow albuminous gland, along which also the duct leading from the kidney appears to he

"The retractor muscle of the body is divided in two very broad and strong parts; they are attached to the anterior end of the foot, below the mouth, and divide posteriorly again into several thin branches. The retractor muscles, supporting the buccal parts, are shorter and also bipartite. The nervous ganglion ring hes immediately behind the mouth and is covered up by the anterior part of the salivary glands, it is very thin and gives only a few very thin branches to the lips, the pedicles and to the generative organs. The small extent of the nervous system is very-striking, as compared with the same organs in the Helicide.

and Zonitide.

"The generative organs fill the anterior part of the body nearly entirely. The uterus is comparatively thin, of grey colour; the albuminous gland, attached to it, very large, nearly as long

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as the uterus, and more than double its thickness. The recentaculum seminis is an oval pedunculated gland, lying either along the uterus, or obliquely across the body, a short distance below the hermaphrodite opening, enveloped in soft tissue. It is provided with a long appendage, attached along the uterus, and equal in length to it. This appendage contains an orange coloured. tough flagellum, filled with a whitish substance, and possibly represents the arrow (or armatorial) sac

"I have not observed the presence of spermatozoa in the socalled 'receptaculum seminis'; it was filled with flattened transparent bodies and some colouring matter. The vas deferens branches off about half way from the uterus, makes a few twists, attaches itself to the tissue just below the hermaphrodite opening, and then shortly after becomes thickened, being at this place fixed with a small and thin retractile muscle. The penis makes three distinct twists, or almost coils, it is very long and the terminal half is more thickened than the other: it ends with a thin flagellum

"The jaw is semilunar, narrow, thin, concentrically very finely and radiately distantly and indistinctly, striated, the anterior

concave edge is nearly perfectly entire.

"The radula is long, moderately narrow, consisting of about 80 transverse, slightly angular series of teeth, there being 53 teeth in each series. The centre tooth is smaller than the adjoining, with a simple, inflected and pointed tip; it is contracted towards the base The 14 inner laterals are longer and stronger than the 12 They are all tru-cuspid; at first the median cusp outer laterals is by far the largest, gradually the lateral increase in size, while at the same time the median cusp decreases, until on the outermost lateral teeth, the three cusps are almost equal On the whole the form of the teeth agrees better with that of the HELICIDE than with the ZONITIDE The dental formula is 12+ 14-1-14+12" (Stoliczka)

The characteristic and peculiar feature of the present genusthe clausilium—has been described by several authors. The first to draw attention to it appears to be Daubenton * who referred to it as an "opercule à ressort." Muller † was the next to give a short description of it under Helia [Clausilia] bidens, but more elaborate accounts were given by J S Miller 1, Dr Grav 6. Cailland | and Fischer I, the latter two elucidating their observations with figures Finally a lucid description, illustrated by elaborate figures, by E. A. Smith and B B Woodward ** will be

^{*} Hist et Mém Acad Sci Paris, 1743, p 47. † Verm Terr Fluv n, 1774, p 117

[†] Ann. Philos r s, 111, 1822, p 378 § Zool Journ 1, 1824, p 212. ¶ Journ Conchyl 1853, p 420, pl 13, figs 1-4. ¶ Man Conchyl 1883, pp 484, 485, figs 251-255 ** Ann Mag Nat. Hist. ser 6, v, 1890, p 209

found very useful While the animal is retracted within its shell the elastic pedicle causes the clausilium to rest against the subcolumellar fold on the inner side and against the shorter palital plice or the lunella, when present, on the outer side, the anterior angle of its inner margin slightly projecting inwardly over the subcolumellar fold, an arrangement which effectively prevents the clausilium being forced to one side from without, thus securing the animal against intruding enemies During extrusion of the animal the clausilium is pushed sideways into the groove between the columellar and subcolumellar folds, only its anterior portion being pressed slightly forward at the dilated part of the groove. The clausilium may, therefore, be regarded to act as a sliding door. and while closed during retraction of the animal, the spaces between the palatal plice are sufficient to admit air for breathing purposes. This peculiar sliding action of the clausilium I have not seen referred to by any of the authors mentioned, which may. perhaps, be explained by the fact that the species which have served as a basis for investigation are rather small and their examination is consequently somewhat difficult. This difficulty may be overcome by utilizing some of the larger Japanese forms such as C. martensi. Herkl., and C. valida. Pfeiffer. By the aid of a watchmaker's eve-glass and a needle mounted in a penholder, the action of the clausilium can be observed with ease and accuracy. The various folds do not in every species rise at the In some the lower palatal fold rises some distance same point below the columellar and the subcolumellar folds, in others again the latter rises half way between the other two. The point where the pedicle of the clausilium is attached to the shell-wall, however, is invariably above the termination of any of the folds, at least in all the species—both Indian and extra-Indian—which I have examined. In all the Indian forms the clausilium has the margins entire, but in some Palmarctic species the margin has a short sinus on the outer side and in others again, the anterior margin is in addition bidenticulate. Five species belonging to the Palearctic subgenus Alopia, 1 e. haueri, cyclostoma, glauca, livida, and lactea, are without clausilium. I must own that at first I entertained considerable doubt as to this, but having by the kind permission of the authorities at the British Museum opened specimens of the species in question. I have satisfied myself that this is actually

The distribution of the genus *Clausilia* within the limits of the Indian Empire is somewhat peculiar. Eleven species are known from India but these are all confined to the north, especially the Himalayan region, while none occurs in the whole of southern India, but a single species is known from Ceylon. Burma has no less than fourteen species, while two are found in the Nicobars and the Mergui Archipelago has one.

A large number of sections or subgenera have been established one of these—Ospara, with five species—is confined to Burma

and another—Garnieria—has two species in Burma, one in China and one in Cambodia. The remainder of the Indian Clauslias belong to three sections, Pseudonenia having twelve species, Euphædusa claiming nine, and Cylindrophædusa with two. Boetiger established a subsection Acrophædusa, for the reception of C. monticola and C arakana, but without having seen specimens for investigation. As this subsection appears to me of doubtful value I have included the species in Euphædusa.

Subgenus PHÆDUSA, H. & A. Adams.

Phædusa, Adams, Gen Rec Moll 11, 1855, p 184 (first species Clausilia cochinchmensis, Pfeiffer); von Martens, Die Heliceen, ed. 2, 1860, p 274 (type C corticina v d Busch), Boettger, Palæontographica, Srd suppl. 1877, p 54, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 390

"Shell smooth, more or less solid, yellowish or rufo-corneous; lunule none or, very rarely, obsolete; spiral lamella usually disjoined; last whorl appressed, rounded at the base; peristome continuous, free." (Adams.)

Section EUPHEDUSA, Boetiger.

Euphaedusa, Boettger, Paleontographica, 3rd suppl 1877, p 57, 191d., Ber Offenbacher Ver. Naturw. 1878, Mitt. p 53 (first species C bacillum); Pleisser & Clessin, Nomencl. Helic Viv 1881, p 390

Type, Clausilia bacillum, Hanley & Theobald

Range India, Burma, China, Japan, Malay Archipelago.

Clausium very wide, frequently subquadrate, somewhat dilated below, strongly curved backwards below, acuminate towards the middle. Upper parietal plica long, below it a smaller one united with the rudimentary, interrupted, or small lunella (rarely absent) which at its lower extremity sends off posteriorly a small branch. The upper parietal fold is marginal and nearly vertical, deeply entering; the lower parietal fold approaching the upper, more or less spirally twisted; the subcolumellar more or less immersed. Aperture subvertical, usually pyriform, with strongly thickened margins. The small shell has convex whorls, a deep suture, is usually thin, shining, and corneous, smooth or finely striated, rarely finely ribbed

270. Clausilia bacillum, Hanley & Theobald.

Clausilia synota, Theobald, J. A. S. B. xxvii, 1858. p. 321 (nom nud.).

Clausilia bacillum (Benson), Hanley & Theobald, Conch. Ind. 1870, pl. 24, fig 1 (non Theobald); Sowerby, Conch Icon. xx,

1875, Clausilia, pl C, fig. 48, Pfeiffer, Mon. Helic Viv viii,

1877, p 503

Clausilia (? Medora) bacillum, Blanford, J A S B xli, 1872, p 200, pl 9, fig 3; Stoliczka, tom cit. p 207

Clausilia (Phaedusa) bacillum (Theobald), Nevill, Hand List, 1,

1878, p 184; Tapparone Canefri, Ann. Mus Civ. Genova, ser. 2, vii, 1889, p 328

Clausilia (Phaedusa (Euphaedusa)) bacillum, Boettger, Ber Offenbacher Ver. Naturw 1878, Mitt p 53, Pfeifer & Clessin,

Nomencl. Helic. Viv 1881, p 390

"Testa subrimata, fusiformis, solidula, glabra, vix striatula, nitidula, superficie sæpe in exemplis veteribus erosa, albido-vel cereo-cornea; spira superne regulariter attenuata, apice obtuso, papillari; sutura simplice impressa Anfr. 9 convexi, ultimus validus striatus, pone aperturam vix compressus; apertura verticalis, piriformi-oblonga, lamella supera validiori, columellari antice vix conspicus, parum torta, intus subfurcata, lunella distincta, plicis palatalibus 2, suturæ parallelibus, supera elongata, altera brevi, a lunella vix disjuncta Peristoma continuum, solutum, album, breviter expansum et incrassatum, margine parietali vix sinuato

"Long 15, anfr. penult diam 35 mm; apert. cum peristomate

3 33 longa, 2 33 mm. lata" (Blanford.)

Hab India Nanclai, Khasi Hills (Theobald, Godwin-Austen), Naga Hills (Chennell); Asalu, Cachar (Godwin-Austen); Burma:

Schegoo (Fea).

"The species varies considerably both in the form and length of the shell. The specimen figured may be taken as the type, but others longer and slenderer are quite as common, they very closely resemble Theobalds in form, differing from it by their smooth shiming surface. One of the most slender specimens measures: total length 15, thickness 3 mm., it has 103 whorls

and is much attenuated towards the apex

"The representation in the 'Conch' Indica' must evidently be taken as that of true bacillum, of which, the authors of that work say, two specimens were known at that time one in Benson's and the other in Theobald's collection These are the two specimens to which Theobald (J A S B. 1858, p 321) refers under the name of ignota, as a provisional name, while the single specimen which he quotes 1 c as 'C bacillum, B' is a somewhat worn Ol asaluensis, and hence Theobald's reference that the species is of the type of C. insignis I have carefully examined with Mr. Theobald his type specimens, and the question as regards the synonymy may be considered as settled; the species must stand as recorded by Blanford" (Stoliczka)

271. Clausilia waageni, Stoliczka

Clausilia waagem, Stoliczka, J. A. S. B. xli, 1872, p. 209, pl. 9, bg 19, Pfeisser, Mon. Helic Viv. vm, 1877, p. 520, Theobald, J. A. S. B. xlvii, 1878, p. 147, ibid., op. cit. 1, 1881, p. 48. Clausilia (Phaedusa) waagem, Nevill, Hand List, 1, 1878, p. 185. Clausilia (Phaedusa (Euphaedusa)) waagem, Boettger, Ber Ossenbacher Ver. Naturw. 1878, Mitt. p. 53, Pfeisser & Clessin, Nomenci. Helic Viv. 1881, p. 391.

Original description.—"Cl testa conoideo-turrita, corneofusca, apice obtusiuscula, sub-rimata; anfractibus 11, paulo convexis, sutura simplici junctis, lateraliter apicem versus paululum concava; omninis transversim oblique confertim costulatostriatis, ultimo antecedente vix latiore, prope aperturam costulato, basi paulum contracto, convexiusculo; apertura verticali, postice (vel supra) angulata; peritremate modice incrassato, vix expanso, albescente, antice recedente, interno soluto, antice rectiusculo, biplicato, plica postica (aut superiore) brevi, altera vix conspicua; lunella distincta, plica longa, tenuissima superposita, altera brevi, a terminatione supera lunellæ haud separata

"Long. tota 18, diam 4; long. apert obliq 4, ejusdem lat.

27 mm " (Stoliczka)

Hub India. Changligalli, near Murree, W. Himalayas, alt

9000 feet (Waagen, Stoliczka); Tandiani, Hazara (Theobald)

"This is the most westerly known species of the genus in India A single, but perfect, specimen was found by Dr. W. Waagen, together with Cl cylindrica, under the bush of an old tree at the above mentioned locality. The nearest allied species is C. 105, but the larger size of the shell, comparative shortness of the two last whorls, larger and more straight aperture readily distinguish this new form" (Stoliczka)

The author in referring to C. 10s as the nearest ally of this species, appears to have overlooked C. monticola, described by Blanford in the same paper, a form which has still closer affinity with it. From this it differs in having the upper part of the

spire less attenuated and the strim are a little coarser.

Four specimens, from Tandiani, in the Theobald collection are somewhat larger than the type, their length being 195 mm Having, by Lind permission of the authorities at the British Museum, opened one of these shells, I am in a position to report on the internal armature. The upper parietal fold is interrupted and the inner portion becomes more elevated, gradually decreasing again as it ascends. The subcolumellar fold rises about the beginning of the last whorl close to the columella and becomes a rather broad flexuous fold at once, terminating even more abruptly at a distance of about 0.25 min. behind the peristome, half-way between the termination of the columellar fold and the lunella. The columellar fold rises a little higher up at the commencement of the last whorl and continues as a fine thread for about half a whorl, when it suddenly increases in height and becomes a flexuous

fold, following the winding of the columella and together with the subcolumellar fold forms a groove-somewhat wider towards the base—into which the clausilium slides when pushed to one side by the animal's extrusion The pedicle of the clausihum rises about the beginning of the penultimate whorl The upper parietal fold rises nearly one quarter of a whorl lower than the subcolumellar fold and becomes a broad fold at once palatal place I find are not quite as described by Stoliczka, there



Fig. 105 - Clausilia waageni

(Showing inside of last whorl with the palatal plicæ)

being no true lunella, although, looking from the outside, it somewhat resembles one. The upper plica is, as usual, long and runs parallel with the suture, the second plica is short and parallel with the upper; between them occurs a short denticle almost uniting them, and from the anterior termination of the second plica a nearly vertical plica runs down, forming a right angle, with a slight oblique support posteriorly from its free lower extremity and terminating close to the subcolumellar fold near the aperture Fig 105 shows the inner side of the last whorl with the palatal plice in situ

272. Clausilia 108. Benson.

Clausika 108, Benson, A M N H sei 2, x, 1852, p 351, Godwin-Austen, J A S B xlv, 1876, p 318, pl 8, fig 18
Clausika 108, Pfeiser, Mon Helic Vit III, 1853, p 612
Clausika 108, Hanley & Theobald, Conch Ind 1870, pl 24, fig 10
Clausika (? Medora) 108, Blanford, J A S B xli, 1872, p 200, pl 9, fig 2

Clausilia jos, Sowerby, Conch Icon xx. 1875, Clausilia, pl. 8, fig 75, Nevill, Hand List, 1, 1878, p 184
Clausilia (Phaedusa (Euphaedusa)) joes, Boettger, Ber Offenbacher Ver Naturw 1878, Mitt p 53, Pfeiffer & Clessin, Nomencl

Helic Viv 1881, p 391

Original description —"Testa vix limata, fusiformi, oblique costulato-striata, pallide cornea, spira gradatim attenuata, apice obtusiusculo; anfractibus 8-9, vix convexiusculis, ultimo ad basin rotundato, antice foitius iemotiusque costulato, apertura pyriformi, lamellis subæqualibus, inferiori furcata, plicis palatalibus duabus, 1^{ma} longissima, a sutura remotiori, 2^{nda} obliqua, brevi, a lunella satis distincta, interdum via divisa, subcolumellari immersa, peristomate continuo, superne soluto, undique breviter reflexo

"Long 13, diam 3, apert long 3, lat. 2 mill." (Benson)

Hah India. Darjeeling, Sikkim (Trotter, Stoliczka, Mainwaring, Blanford); Bhutan (Blanford), Dafia Hills, Assam (Godwin-

Austen)

"Hab Temperate regions of Sikkim and Butan, in the Eastern Humalayas, from about 5000 to 9000 feet It doubtless also exists in Ningl It is generally met with at the roots of oaks and other large trees

"In this species, as was noticed by Mr. Benson, the lunule is sometimes broken un into whort oblique plaits above, and consequently the number of palital plice varies. Sometimes there is only the long lunellar plant above the lunule, in other specimens there are, besides the long one, two short place" (Blanford)

Clausilia ios appears to be one of the commonest species, to judge by the number of specimens in collections. There are shells in the British Museum, presented by Blanford in 1860, which have 10 whork—therefore with one whork more than Blanford's type—and measure 13.5×3 mm. Four specimens in the Cuming collection, also of 10 whorls, attain a length of 14 mm. Beddome collection is particularly well supplied, as I have counted no less than two dozen these are from Darjeeling somewhat resembles C. throbulds but it is smaller and the palatal plice are nearer the aperture

273 Clausilia ceylanica, Benson,

Clausilia ceylauca, Benson, A. M. N. II. ser 3, x1, 1863, p. 89; Pfeifler, Mon Helic Viv vi, 1868, p 427, Nevill, Enum Helic Ceylon, 1871, p 3, Hanley V Theobald, Conch Ind 1875, pl 118,

Clausilia (* Medora) reglamica, Blanford, J. A. S. B. vh., 1872,

p 201, pl 9, hg 1

Clausilia (Phaedusa) cylanica, Nevill, Hand List, 1, 1878, p. 184 Clausilia (Phaedusa (Luphaedusa)) ceylanica, Boettger, Ber Offenbacher Ver Natury 1878, Mitt. p 53, Pfeisler & Clessin, Nomenel Helic Viv 1831, p 391

Luphaedusa ceylanica, Jousseaume, Mem Soc Zool France, vii,

1891, p. 290

Original description —" C testa vix rimata, fusiformi, oblique confertissime costulata, costulis nonnullis undulatis, fuscescentiolivacea, spira gradatim attenunta, lateribus convexiusculis, apice obtusiusculo, sutura impressa, anfractibus 8, convexiusculis, ultimo ad basin rotundato, apertura subobliqua, pyriformi, lamellis contiguis, inferiore valde exserta, torta, plicis palatalibus 2, subæqualibus, elongatis, columellari immersa; peristomate continuo, superne soluto, undique subexpanso, reflexiusculo

"Long 12, dum 2' mill, apert long 3, lat 2 mill" (Benson)

Hab. Ceylon (H. Nevill), Fort McDonald (Layard)

"Found by Mr I Layard at an altitude of 4500 feet in the central mountain mass of Ceylon The nearest Indian ally in form is the Darpling C ios, from which it may at once be

distinguished by its sculpture, texture, and the internal plice." (Benson)

Blanford, when figuring Clausilia ceylunica, states that Benson. in describing the species, overlooked the lunule, which is as well

developed as in C ros and C bacillum.

The only known species from Ceylon. In addition to the features mentioned by Benson it may be said to be characterized by the short upper parietal fold. The shell figured by Hanley and Theobald has been presented to the British Museum by Mr. Harvey. It is a trifle more convex than Benson's type, its diameter being 3 mm, whereas Benson, in his original description. mentions 2.5 mm Like most species of Clausilia it varies somewhat in size, for two specimens in the Beddome collection, both of eight whorls, measure 105×275 mm and 11×3 mm respectively.

274. Clausilia theobaldi, Blanto d

Clausilia (? Medora) theobaldi. Blanford, J. A. S. B. xli. 1872.

p 201, pl 9, fig. 5

Clausilia theobaldi, Pfeisier, Mon Helic Viv viii, 1877, p 521

Clausilia (Phaedusa (Euphaedusa)) theobaldi, Boettger, Ber Offenbacher Vei Naturw 1878, Mitt p 53, Pfeisier & Clessin, Nomencl Helic Viv 1881, p. 391

Original description - "Testa rimata, fusiformi turrita, cornea, confertim flexuose costulata, transluceus Spira turrita, sensim attenuata, lateribus superne subrectis, apice acutiusculo, sutura impressa Anfi. 11 convexi, antepenultimus et penultimus majores, ultimus juxta suturam tumidiusculus infra plicam palatalem superam compressus, subtus rotundatus Apertura vix obliqua, piriformis, lamellis approximatis, mediocribus, supera acuta, infera immersa, lunella distincta, plicis palatalibus 2, supera elongata, altera brevi Peristoma rectum, expansum, solutum, margine palatali haud sinuato.

"Long 22, diam. 35 mm, apert 35 mm. longa, 26 lata"

(Blanford.)

Hab Burma Tonghu (Theobald, Blanford); Mai-i, Arakan

Coast (Theobald)

There are two specimens in the Theobald collection in the British Museum, from hills to the east of Tonghu, the type locality, whose length is less than that indicated in the original description, the dimensions being 1775×35 mm although they possess half a whorl more. The figure given by Blanford in J. A S. B. 18 still smaller, measuring only 16 mm The Beddome collection also contains specimens which reach only 17 mm in length, the diameter, nevertheless, being 3 5 mm. In the Theobald collection I found three shells labelled "an akana, Stoliczka, Mai-i, Arakan Coast," one of which undoubtedly belongs to the present species

Blanford in his diagnosis only mentions two palatal folds, but I have found a third, which, however, is not visible without opening the shell

275 Clausilia burmanica, sp n

Shell rimate, fusiform, fuscous, translucent, very closely invested with fine wavy strim, traversed by rather irregular, somewhat indistinct spirals. Spire turreted, gradually attenuated, the sides not concave, apex acute; suture impressed. Whorls 11½, convex, last scarcely narrower than penultimate, not compressed below upper palatal plica. Aperture vertical, subquadrate Parietal folds rather distant, the upper not interrupted, lower rather elongated before entering. Palatal plica three, upper long, parallel with the suture; the other two curved, almost meeting posteriorly, rather distant, one being close to the upper plica, the other nearer the aperture. Peristome solute, the margins expanded and reflexed, outer margin descending obliquely.

Long. 21, diam 4 mm

Hab Burma Toughu (Theobald)

Type in the British Museum.



Fig 106 - Clausilia durmanica

The specimen upon which this new species is based occurred, with two shells of Clausilia theobalds, from which it differs by the much more wavy, closer, and finer strie, the presence of spirals, and the subquadrate aperture, the two lower palatal place, moreover, instead of being straight and rather close together, as in theobalds, are rather distant and curved, their posterior terminations nearly meeting, as seen in fig 106 b, which shows the inside of the last whorl with the palatal place in situ; finally, the last whorl is not compressed below the upper palatal place, the parietal folds are more distant, the upper is not interrupted and the lower longer before entering, proceeding horizontally

The Hungerford collection in the British Museum contains two specimens from Bhamo, which I also refer to this new species,

they possess twelve whorls

276 Clausilia monticola, Blanford.

Clausilia (Phædusa) monticola (Godwin-Austen, MS), Blanford, J A S B 711, 1872, p 204, pl 9, fig 13, Nevill, Hand List, 1, 1878, p 183

Clausilia monticola, Hanley & Theobald, Conch. 1nd 1875, pl 118, ing 7, Pfeiffer, Mon. Helic. Viv. viii, 1877, p. 467
Clausilia (Phaedusa (Actophaedusa)) monticola, Boettger, Ber. Offenbacher Ver. Naturw. 1878, Mitt. p. 57; Pfeiffer & Clessin, Nomencl. Helic. Viv. 1881, p. 392

Original description:—"Testa rimata, exilis, elongata, fusiformisubulata, solidula, brunnea vel brunnescente-grisea, parum nitida; superficie sæpe erosa, spiræ lateribus antice rectis, apicem papillarem versus concaviusculis; sutura simplice, impressa Anfr. 13 convexi, primi 4 fere cylindrici, antepenultimus vix quam penultimus major, ultimus ad basin rotundatus, haud compressus. Apertura piriformis, fere verticalis, lamella palatali sinistrorsim deflexa, acuta; columellari subprofunda; lunella nulla, plicis palatalibus fere parallelis 6–7, supera valde elongata Peristoma continuum, vix solutum, leviter sinuatum, superne repandum, expansiusculum, mediocriter incrassatum, album, margine parietali leviter sinuato.

"Long 21, diam. anfr. penult 4 mm; apert. cum perist 3 66 longa, 2.66 lata." (Blanford)

Hab India: Burrail Hills, Assam; North Cachar, alt 6500 ft.

(Godwin-Austen).

"This species is well distinguished from its allies by its slender

shape and numerous whorls (Blanford)

The relatively long last whorl and the strongly reflexed and expanded right and basal margins of the peristome are also striking features separating it from the other Indian Clausilias It bears some resemblance to C. waageni but the upper portion of the spire is more slender and attenuated. A specimen from the Hanley collection, presented to the British Museum by Mr. Harvey, is presumably the one figured in Conch Ind, but it has the aperture more pear-shaped than is shown in the figure, the outer margin being more curved. It possesses 14 whorls and The figure given by Blanford and Stoliczka in measures 22 mm J. A S. B. is more accurate A shell with no precise habitat, presented to the British Museum in 1869 by Dr. Horsfield, and labelled C. cylindrica, is perhaps a small form of C monticola. It has 12 whorls and measures 16×3 mm Two specimens from North Cachar in the Beddome collection are both composed of 12 whorls, and have a diameter of 375 mm, but whereas one measures 21 mm the other only attains a length of 185 mm

277. Clausilia arakana, Stoliczka

Clausilia arakana (Theobald), Stoliczka, J A S B xli, 1872, p 210, pl 9, fig 20; Hanley & Theobald, Conch Ind 1875, pl 118, figs. 8, 9, Sowerby, Conch Icon xx, 1875, Clausilia, pl 9, fig 78, Pfeifier, Mon Helic Viv viii, 1877, p 467 Clausilia (Phaedusa) arakana, Nevill, Hand List, 1, 1878, p 183 Clausilia (Phaedusa (Acrophaedusa)) arakana, Boettger, Ber Offenbacher Ver Naturw 1878, Mitt p 57, Pfeifier & Clessin, Nomenci Helic Viv. 1881, p 392

Original description — "Cl testa strammeo-albida, subfusiformeturrita, apice attenuata, aperturam versus subangustata, non rimata; anfractibus 10–12, paulum convexiusculis, sutura profunda simplici junctis, transversim oblique capillaceo striolatis, apertura rectiuscula, sub-rectangulari, antice subrotundata, marginibus modice dilatatis et incrassatis, labio breviter libero, feie recto, biplicato, plica antica (seu inferiore) valde oblique intrante, plicis palatalibus quinque, fere æquidistantibus et inter se parallelis, supera longissima, cæteris subæqualibus

"Long. 17-20, lat 38-4, long apert 4-44, lat 3-32 mm."

(Stoliczka)

Hab. Burma Tonghu and hills SE of Akyab. Arakan, and

Mai-1, Sandoway district (Theobald).

"This is the new Arakan species to which Mr Blauford alludes at p. 205, when speaking of Cl monticola; it differs from this last by its more fusiform instead of conoidally turreted shape, its thinner texture, larger aperture and somewhat differently arranged palatal folds. I have given illustrations of a shorter form with ten whorls, and of another with twelve whorls, the former is a single specimen from the hills SE of Akyab, the other was collected by Mi Theobald at Mai-i, in the Sandoway district These two forms represent the extreme variations which were noticed among a large number of specimens" (Stoliczka)

Two shells, from Mai-1, in the Theobald collection, measure 20×4 mm, and distinctly show the five palatal place indicated in

the diagnosis

278 Clausilia lemani, sp. n

Shell rimate, fusiform, fuscous corneous, rather solid, opaque, huely striate, closely ribbed behind the aperture on the last whorl, some indistinct, very fine spirals perceptible on the later whorls. Spire turreted, the sides slightly concave, apex slightly obtuse, suture shallow, especially on the later whorls. Whorls 11, the



Fig 107 .- C'ausilia lemani

earlier slightly convex, the later ones flattened, the last but little narrower than the penultimate, with a shallow furrow below the lower palatal plica behind the peristome and gibbous around the umbilical slit. Aperture a little oblique, subovate. Parietal folds rather close together, upper not interrupted, lower deflexed towards the columella and descending with the columellar margin Palatal plice three, rather near the aperture, the upper rather

short, parallel with the suture; the second very short, parallel with the upper; the third longer and oblique, entirely visible from the aperture Peristome slightly thickened, not expanded and but little reflexed, the parietal margin not solute, without sums at the upper parietal fold, columellar margin curved, obliquely descending, basal margin curved, outer margin a little inflexed

Long 16, diam 42 mm. Hab Burma Arakan

Type in Mr. Leman's collection.

Two specimens in the late Colonel Beddome's collection, now in the possession of Mr G. C Leman, were labelled C. arakanensis, but upon examination they proved to be quite distinct, and in basing a new species upon them I have much pleasure in associating with the new form the name of Mr Leman, who upon several occasions has readily given me access to this important collection, so rich especially in Indian and Burmese shells.

The new species, while allied to *C. arakanensis*, may readily be separated by its more convex spile, its more obtuse apex, and the more closely coiled whorls, for although shells of 10 whorls of *C. arakanensis* measure 17 mm in length, *C lemani* with 11 whorls only attains 16 mm., the shell, moreover, is striated, not ribbed. The palatal plicæ are also less in number, and instead of all being parallel, the lowest is nearly vertical, and they are all much nearer the aperture.

Section PSEUDONENIA, Boettger.

Pseudonenia, Boettgei, Palæontographica, 3rd suppl 1877, p 59, ibid, Bei. Offenbacher Ver Naturw 1878, Mitt p 39 (first species C gouldiana), Pfeiffer & Clessin, Nomencl. Helic Viv 1881, p. 391

TYPE, Clausilia gouldiana, Pfeiffer

Range India, Burma, China, Japan, Malay Archipelago.

Clausilium attenuated below, the blade somewhat elongated and dilated below. The palatal plice varying in number, the upper rather long. Lunula nearly always absent. The upper parietal fold more or less oblique, subcolumellar fold hidden. Aperture large, protracted below, the right upper margin always more or less sinuate towards the upper parietal fold, the peristome strongly expanded and reflexed. The shell has few whorls, usually an acute apex, is conneous and more or less finely striated.

279. Clausilia gouldiana, Pfeiffer.

Clausilia gouldiana, Pfeiffer, Malak Blatt in, 1857, p 259, ibid, Mon Hehe Viv. iv, 1859, p 724, ibid, Novit Conch ser. 1, i, 1860, p 123, Hanley & Theobald, Conch Ind 1875, pl 118, ings 2, 3, Sowerby, Conch Icon xx, 1875, Clausilia, pl. 16, fig 148

Clausilia (Phædusa) gouldiana, Blanford, J. A. S. B. xli, 1872, p. 203, pl. 9, fig. 10, Stoliczka, tom. cit. p. 208
Clausilia (Phaedusa (Pseudonenia)) gouldiana, Boettger, Ber Offenbacher Ver. Naturw. 1878, Mitt. p. 54, Pfeiffer & Clessin, Nomencl. Helic. Viv. 1881, p. 148

Original description — "T. leviter rimata, fusiformis, solida, confertissime capillaceo-striata, sericea, rubicunda; spira sursum regulariter actenuata, apice alba, obtusula; anfr 11-11½, summi convexi, sequentes planiores, ultimus angustatus, basi non compressus; apertura piriformis; lamellae mediocres, infera alte ascendens, lunella nulla; plicae palatales 5-6, supera 1 elongata, 4-5 brevissimae, subparallelae, locum lunellae obtinentis; subcolumellaris inconspicua; perist. continuum, roseum, intus callosum, undique expansum et reflexiusculum, margine supero repando

"Long 241, diam infra medium 6 milk. Ap oblique fere

6 mill. longa. 4% lata" (Pfeiffer.)

Hab. Burma: Mergui (Gould); Moulman (Blanford), Phaloung and Zwagabin (Theobald, Hungerford); Tenasserim and Salween Valley (Beddome), Gethebian ku and Phabongku (Theobald).

Is stated by Pfeiffer to be very closely allied to Cl insignis,

Gould, and philippiana, but well distinguished.

Stoliczka observes that it is also "one of the most variable species, both in colour and form. Young specimens are either brown or of a beautiful rosy tinge; older shells, after they become solidified, either retain the brown or pink colour, or the lip becomes yellowish-brown or perfectly white; the 3-5 top-whorls are always white. The form differs from fusiform to highly turreted, as may be indicated by the following measurements.—

a. long. 23, lat 6, long apert 52, ej lat. 42 mm b ,, 28, ,, 63, ,, , 62, ,, ,, 5 ,, c ,, 32, ,, 65, , ,, 6, ,, ,, 5 ,,

All three specimens are from Moulmain: a is almost exactly identical with Pfeiffer's original figure of the species, b and c are a white and a yellowish lipped variety from Mr. Theobald's collection, c has an almost abnormally small aperture as compared

with the length of the shell."

A fairly common species. The Cuming collection contains three specimens from Mergui, with pale rufous pink peristome and composed of 10½ and 11 whorls. There are several specimens in the Theobald collection three from Moulmain, with 10½ whorls, measure 26×6.75 mm; three from Phabougku, with 11½ and 12 whorls, reach a length of 26.5 mm, with a diameter of only 6 mm; three from Gethebian Ku, with 10½ and 11½ whorls, measure 25×6 mm.; while three more from Zwagabin, near Moulmain, have a pink mouth and possess 11 whorls but only attain a length of 22 mm, with a diameter of 55 mm. In the Beddome collection I found a specimen from the Salween Valley, pale fuscous in colour with a pink mouth, with 10 whorls,

measuring 22×6 mm., and three shells from Tenasserm, also pale fuscous, but more solid in texture, composed of 11 whorls, and measuring 25×6 , 25×6 25, and 24×6 25 mm respectively Finally, the late Miss Linter's collection, now in the Exeter Museum, yielded two specimens from Phabongku, one of a decided pink colour, with pale pink peristome, each of 11 whorls,

and measuring 21 5×6 mm

Clausilia gouldiana is closely allied to C. insignis, but may be distinguished by its smaller size, smaller aperture, and lighter colour, but more especially by the more acute apex, a feature by which it may readily be separated from its ally. The 3 or 4 apical whoils also are usually white or pale corneous. The whorls increase very slowly at first, then rather rapidly, the upper part of the spire, consequently, being more concave; the later whorls are rather more convex than in insignis. There are from four to six palatal plice, the first always long, the others vary in length but are very short comparatively; they may be equal in length or the second and fifth may be longer and the third and fourth very short, or they may gradually decrease in length.



Fig 108 - Clausilia gouldiana (Harvey collection)

The shell figured in Conch Ind. pl. 118, figs. 2 & 3, which has been presented to the National collection by Mr. Harvey, is rather short and ventricose, it possesses $9\frac{1}{2}$ whorls, and measures 23.5×6 mm. This, according to Hanley and Theobald, may be unsignise of Gould not of Pfeiffer, but I prefer to regard it as a form of gouldiana.

I give a figure of this shell and a view of the inside of the last whorl, with the palatal place in situ. The upper place (partly shown) is long, near to and parallel with the suture, the second is stouter, its anterior extremity curving obliquely downwards; the third very short, oblique, the fourth a trifle longer, also oblique, the fifth still longer, nearly vertical, its anterior extremity giving off a slight hidge below near the subcolumellar fold.

Var. magna, nov

Differs from the type in being less ventucese. A specimen from Moulmain, in the Theobald collection, possesses 13½ whorls, and measures 32 mm in length with a diameter of 65 mm

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There are seven palatal phase: the upper long, near to and parallel with the suture, the second one quarter of the length of the upper, the third still shorter but parallel with the first two, the fourth very short and oblique, the fifth considerably longer, oblique, with a short support below near its posterior extremity, the sixth also oblique and bifurcate posteriorly; the seventh curved, near the parietal margin of the peristome. This shell is here delineated

CLAUSTERA



Fig 109 - Clausilia gonlaiana var magna

A second specimen from Phaboo, in the Hungerford collection, measures 125 × 6 inm and possesses 121 whorks

280 Clausilia andersoniana, Mollendorff.

Clausilia (Pseudonema) andersomana, Mollendorff, J. A. S. B. I., pt. 2, 1882, p. 12, pl. 1, fig. 12

Original description —"Test i ventriculoso-fusiformis, solidula, subtilissime striatula, fere lævigata, pallide corneo-fusca, apice obtusiusculo, anfr. 10 convexiusculi, ultimus valde attenuatus, subtus rotundatus, distinctius striatus, apertura parum obliqua, oblique piriformic, peristomi continuum valde solutum, expansum, reflexiusculum, pallide cornicum. Lamella parietalis supera obliqua, sat valida, cum spirali continua, infera crassa ante marginem subabrupte desinens, subcolumellaris immersa. Plica principalis valde elongata, palatales tres subventrales, divergentes, infima arcuata. Clausilium?

"Alt 20, lat 4, apert long 41, lat 31 inm" (Mollendorff.)

Hab Mergui Archipelago (Anderson)

"Nearly related to insignis, Gould Differs by the smaller size, less ventricose shape, the number of whorls 10 instead of 9, the more elongate and oblique aperture, the freer and more protruding peristome, and its paler colouring and by the closing apparatus. The latter is much more immersed inasmuch as the palatal plaits of Cl insignis are lateral, while those in the new species are nearly ventral and are, together with the inner end of the very

long principal plait, conspicuous in the penultimate whorl above the aperture. Besides, the number of palatal plants is only three against five of Cl insignis" (Mollendorff)

A doubtful species not seen by me Judging from the figure it is more nearly related to C. gouldiana than to insignis Specimens of the former from Mergui, in the British Museum (Cuming collection), resemble it, but they are a trifle more ventricose and of a pinkish colour; they are composed of $10\frac{1}{2}$ whorls and measure 23 mm. It should be borne in mind that C gouldiana varies considerably, and I strongly suspect that Mollendorff's species will not stand the test of comparison of actual specimens.

281. Clausilia gracilior, Hanley & Theobald

Clausilia insignis, vai gracilior, Hanley & Theobald, Conch Ind 1870, p. 12, pl. 24, fig 3

Shell subrimate, fusiform, turreted, rather solid, pale corneous, finely and closely striated, the strie coarser and more distant behind the aperture, some minute spirals on the later whorls. Spire turreted, apex obtuse, suture impressed Whorls 9, slightly convex, increasing slowly, last whorl but little narrower than penultimate, flattened near the suture, not compressed below the upper palatal plica. Aperture slightly receding below, pear-shaped, parietal folds rather distant, the upper compressed, elevated at first, becoming depressed after entering, and again more elevated higher up, the lower very stout, obliquely entering.



Fig 110 — Clausilia gracilior

Palatal plicæ 5, the upper long and parallel with the suture, the second about one-third the length of the upper, parallel at first, its anterior extremity deflexed, the third and fourth very short, oblique, the fifth a little longer, curved, about parallel with the lower suture; the fourth and fifth folds, as well as the subcolumellar fold and the anterior part of the clausilium, are visible from the aperture Peristome thickened, expanded, and reflexed, solute, the parietal margin with a slight sinus at the upper parietal fold

Long 26, diam 5 mm Hab Burma Moulmain. Hanley, when figuring this form, considered it a variety of Cl insignis, and in his explanation of plates indicated Pfeiffer as being responsible for the name gracilior, giving the following reference. "Clausilia insignis, var. gracilior, Pfeiffer (as of Gould), Mon. Helic vol 3, p 589; Novit. Conch vol. i." Now, Pfeiffer, at the place cited, simply quotes Clausilia insignis, Gould, giving a description based upon a specimen in the Caming collection, but he mentions no variety whatever, and in Novit Conch. vol i, pl 34, figs 15-17, illustrates typical insignis. The present form I consider quite distinct from Gould's and worthy of specific rank. It is more cylindrical in shape, the apical whorls increasing more gradually, the last whorl is not obliquely deflexed, the aperture is more dilated, and the parietal margin of the peristome is more widened and sinuous, while the shell is pale corneous not dark chestnut.

The shell figured by Hanley and Theobald having been presented to the British Museum by Mr. Harvey, I have taken the opportunity of giving a more faithful representation of it, together with an enlarged view of the last whorl showing the palatal place. As, moreover, it was never described, I have also added a full description

282 Clausilia insignis, Gould

Clausilia insignis, Gould, Proc Boston Soc Nat. Hist. 1, 1844, p 140, ibid, Boston, Journ Nat Hist. iv, 1844, p 458, pl 24, ing 8; Pfeiffer, Mon Helic Viv 11, 1848, p 423; ibid, Zeits Malak vi, 1849, p 94, ibid., Mon Helic Viv 11, 1853, p 589; ibid., Novit. Conch ser I, 1 1860, p 122, pl. 34, figs 15-17, ibid., Conch Cab, Clausilia, 1861, p 300, pl. 34, figs 10, 11; Hanley & Theobald, Conch Ind. 1870, pl 24, fig 2 Sowerby, Conch Icon, xx, 1875, Clausilia, pl 6, fig 53, pl 7, fig 53 b Clausilia (Phaedusa) insignis, Pfeiffer, Malak. Blatt ii, 1856, p 180, von Martens, Die Heliceen, ed 2, 1860, p 275, Blanford, J A S B xli, 1872, p 204, pl 9, fig 11 (insignis of Gould), fig 12 (insignis of Pfeiffer); Stoliczka, tom cit p 203 Clausilia (Phaedusa (Pseudonenia)) insignis, Boettger, Ber Offenbacher Ver Naturw 1878, Mitt p 55, Pfeiffer & Clessin, Nomencl Helic. Viv 1881, p 391

Original description — "Testa fusiformi, sinistrorsa, solida, castanea, anfr. 9 convexis, leviter striatis, apertura purpurea, rotundata, lamellis duabus fortibus postice, et quinque tenuibus per testam apparentibus, intus instructa; labro valde reflexo.

"Shell reversed, solid, large, fusiforin, ventricose, of a dark chestnut-brown; whorls eight, convex, very delicately and regularly striated, shining, summit maniflated; aperture ovate, broadly rounded in front, with a sinus behind, produced by one of the two large folds which are there found; on breaking away half of a volution, we find five other very delicate lamine, which may be seen externally, by looking at the umbilical aspect of the

shell: the posterior one is near the suture and extends nearly a whole volution; the others intervene at nearly regular intervals. between it and the umbilious, throat purplish, lip very broad, flattened, white, tinted with purple.

"Length 1 inch [= 25 25 mm], breadth $\frac{1}{7}$ of an inch [=5 mm]." (Gould)

Hab. Burma · Tavoy (Gould), Yethebian, near Moulinain (Stoliczka); Tenasserim (Beddome), Zwagabin (Theobald); Kargan,

near Moulmain (Theobald)

There is a discrepancy with regard to the number of whorls between Gould's latin diagnosis and his English description, the former stating that there are nine, whereas the latter mentions The figure of the shell, although not very clear, rather favours the former.

Stoliczka also refers to a slight discrepancy undoubtedly exist-

ing between Gould's original figure and description

"He states the number of whoils to be 8 or 9, and the apex 'mamillated,' while the figure shews it shortly pointed; then again he gives 'length 1 inch, breadth 1 of an inch.' The original figure (whether enlarged or not, it is not stated) represents a shell of 28 mm in length and 7 in thickness, the second dimension is, therefore, only one fourth of the total length, instead of one fifth, if the latter were the case, the shell would be an extremely slender one, and comparing it with gouldiana, as a shell of the same type, I would prefer to consider Gould's figure as more probably correct than his measurement Now, allowing for these discrepancies in Gould's original statements, I am inclined to think that Pfeiffer's species is very closely allied to, if not exactly identical with, true insigms, but Hanley and Theobald's figures certainly seem to be somewhat different from both the preceding; however, they do not exclude the possibility of representing mere variations of one and the same species Whether the form of the aperture in Gould's original figure is slightly exaggerated or not, I think the great expansion of the outer lip is decidedly somewhat abnormal, and setting aside this point the remaining differences between the shells figured as insignis are not greater than those between the different varieties of lonostoma or gouldiana"

In order to try and solve the question raised by Stolic/ka, as to the discrepancy between Gould's figure and description, I applied to Dr John M. Clarke, the Director of the Albany State Museum, but to my regret that gentleman informs me under date of July 1, 1914, that no specimens of Clausilia insignis can be found in the collection He states that no such species is listed in the catalogue of the Gould collection prepared by Dr Gould's daughter, and as this catalogue is an approximately accurate list of the shells delivered when the collection was purchased in 1867, he thinks that they probably never had the type of that species

Clausilia insignis appears to be fairly common, and I have

seen a considerable series, but I have not observed the same amount of variation as in Clausilia gouldiana It has close affinity with the latter, but may at once be distinguished by the more obtuse apex, the apical whorls being stouter and increasing at once, not gradually as in gouldiana, the upper part of the spire is consequently more cylindrical and not concave number of whorls ranges between 81 and 10, and the palatal plice vary in number from five to seven, the last being more nearly vertical than in gouldiana The shell is generally of more solid texture, darker, and unicolorous, not whitish or pale

corneous, as in its ally, and the peristome dark

In the Cuming collection I found two shells from Tavoy, labelled by Pfeiffer, which are rufous coineous, with the early whorls paler; one has 91 whorls, and measures 26 × 65 mm, the other has 10 whorls, and attains a length of 275 mm, the diameter being the same as in the first Another tablet in the Cuming collection bears three shells, also from Tavoy, which are pale corneous with the peristome almost white, one of which has 10 whorls and measures 26 × 6 mm, but a second with 9 whorls does not exceed 245 mm. in length, although its diameter is also The Beddome collection contains four specimens, very solid and dark chestnut in colour, with a dark fuscous peristome, one of $8\frac{1}{2}$ whorls measures 26×7 mm, another of 9 whorls is 27×7 mm, while the other two have each $9\frac{1}{2}$ whorls and measure respectively 28×7 and 30×65 mm Lastly, a variety from Zwagabin in the Theobald collection is pale corneous and less ventricose than the type, possesses 10 whorls and measures $27 \times 6 \text{ mm}$

283 Clausilia fusiformis, Blanford

Clausilia fusiformis, Blanford, J. A. S. B. XXXIV, 1865, p. 80 Pfeifler, Mon. Helic. Viv. vi, 1868, p. 410, Hanley & Theobald, Conch. Ind. 1870, pl. 24, fig. 6, Sowerby, Conch. Icon. XX. 1875, Clausilia, pl. 7, fig. 62, Pfeiffer, Mon. Helic. Viv. viii, 1877, p 464

Clausilia (Phadusa) fusiformis, Blanford, J. A. S. B. vli, 1872, p. 203, pl. 9, fig. 9; Nevill, Hand List, 1, 1878, p. 183
Clausilia (Phaedusa (Pseudonenia)) fusiformis, Boettger, Ber

Offenbacher Ver Naturw 1878, Mitt p 54, Pfeiffer & Clessin, Nomenci Helic Viv 1881, p 391

Original description - "Shell not rimate, fusiform, horny, thin, white, obliquely, very closely and finely costulately striated throughout Spire diminishing slowly at first above the middle, then rapidly attenuate towards the acute apex, suture simple, scarcely impressed, deeper towards the apex Whorls 9, convex above, flattened below, the last very little narrower than the Aperture semioval (nearly semicircular), upper parietal plant very fine, internal palatal teeth 7, the uppermost by far the longest Peristome thin, expanded, not continuous,

the margins being distant, and united by a thin callus; columellar margin straight and very long posteriorly.

"Length 23. diameter 6 mm." (Blunford)

Hab Burma. Arakan hills west of Henzada (Blanford): Pegu (Theobald).

But a solitary specimen was met with belonging to this form, which is more turned in the centre than any of its allies. C. insians. Gould, etc. The non-continuity of the peristome may be due to immaturity in the specimen found. The shape of the mouth may also possibly be slightly modified in older examples. but the general form doubtless remains the same, and is alone

sufficient to distinguish the species." (Blanford.)

The shell figured in Conch. Ind has been presented, with other shells from the Hanley collection, to the British Museum by Mr Harvey; it measures 225×6 mm. Three specimens in the Theobald collection have a length of 23 mm. and a diameter of 65 mm, while the Beddome collection contains two specimens measuring 23 × 6.5 mm All are from the Arakan Hills. The species tends to connect C insignis with such forms as C philippiana, C ovata, and C bulbus, but it is more acuminate and lacks the very obtuse apex of the section Ospara, to which these species The upper parietal fold occurs on the outer edge of the parietal margin of the peristome, the lower and the subcolumellar folds only reach the inner edge; there are six palatal plice, the upper long, the other five short.

284 Clausilia ferruginea, Blanford.

Clausilia (Phædusa) ferruginea, Blanford, J A S B xh, 1872, p 202, pl 9, fig 7 Nevill, Hand List, i, 1878, p 184 (incl var tumida)

Clausilia ferruginea, Hanley & Theobald, Conch Ind 1875, pl 118,

figs 5, 6, Pfeisfer, Mon Helic Viv viii, 1877, p 466 Clausilia (Phaedusa) (Pseudonema)) ferruginea, Boettger, Ber. Offenbacher Ver Naturw 1878, Mitt p 54, Pfeisfer & Clessin, Nomencl Helic Viv 1881, p 391.

Original description —"Testa subrimata, elongato-fusiformis, solida, fere glabra, striatula, haud nitida, sordida et interdum pallide ferruginea; spira alta, lateribus sursum subrectis, apice obtuso papillari, sutura impressa, valde crenulata. Anfr 11 convexi, ultimus capillaceo-striatus, basi rotundatus. Apertura fere verticalis, subtrapezoidalis, marginibus lateralibus tere parallelis, basalı rotundato, lamella supera acuta, sınıstrorsım ınflexa, columellari mediocri, plicis palatalibus circa 5, supera elongata, haud procul ab apertura desinente, suturæ parallela, cæteris magis obliquis curvatisque Peristoma continuum, album, expansum, parum incrassatum, margine supero iepando, leviter sinuato.

"Long. 30, diam 55 mm; apert. cum perist. 65 longa,

4.66 lata." (Blanford)

Hab. India. Naga Hills, Assam (Masters).

[&]quot;Var. tumida, anfractibus ultimus aperturaque majoribus.

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"Long circa 33, diam 65 mm., apert 7 longa, 5 lata" (Blanford)

Hab India Gologhat, Assam (Masters, Theobald), North

Cachar (Godwin-Austen); Naga Hills (Chennell)

"This fine species, the largest hitherto found in Assim or the Himalayas, resembles C lovostonia in its strongly crenulated sutures and in form, but differs in its larger size and more numerous whorls It was first found by Mr Masters in 1860. in the hills south of Gologhat, together with Spiraculum masterer and other interesting shells. The more turned variety has lately been obtained in North Cachar by Major Godwin-Austen." (Blanford)

The Beddome collection contains two specimens, one of which is decollated, but the second is entire, and while, like the type. composed of eleven whorls, it only measures 27 × 5 25 mm the Theobald collection is a shell from Gologhat, where the species

was first discovered

285 Clausilia asaluensis, Blanford.

Clausilia (Phæduea) asaluensis (Godwin-Austen), Blanford, J A S B xli, 1872, p 202, pl 9, fig 8 Clausilia asaluensis, Hanley & Theobald, Conch Ind 1876, pl 159,

fig 5, Peiffer, Mon Helic Viv viii, 1877, p 466

Clausilia (Phaedusa) asaluensis, Nevill, Hand List, 1, 1878, p 184 Clausilia (Phaedusa (Pseudonenia)) asaluensis, Boettger, Ber Offenbacher Ver Natury 1878, Mitt p 54, Pleister & Clessin,

Nomenci Helic Viv. 1881, p 391

Original description -" Testa non rimata, fusiformi-turrita, alba vel pallide castanea, solidula, striata, ad anfractus duos ultimos capillaceo-striata Spira sensim attenuata lateribus superne concaviusculis, apice obtusiusculo, sutura impressa, confertim minuteque crenulata Anfr 12-13, convexi, antepenul-timus maximus, penultimus parum minor, ultimus ad latus compressus, ad basin rotundatus. Apertura subverticalis, piri-formis, lamella supera compressa, columellari immersa, lunella nulla, plica palatali supera elongata, suturæ parallela, secunda etiam parallela, mediocri, cateris obliquis Peristoma leviter sinuatum, album, incrassatum, continuum, breviter solutum.

"Long 235, diam 5 mm; apert c perist 5 longa, 366 lata"

(Blanford)

Hab India Asalu, North Cachar, alt 7000 feet (Godwin-

Austen), Khasi Hills (Theobald)

"This species is easily distinguished from both C lorostoma and C ferruginea by its more numerous whorls and finely crenulate sutures In size it is intermediate between the two, some specimens being as much as 26 mm, or rather more than an inch in length " (Blanford)

Ulausiha asaluensis is, as might be inferred from Blanford's remarks, although he does not actually say so, intermediate in its characters between C lorostoma and C ferruginea, the sutures being finely crenulate. The Beddome collection comprises two specimens from North Cachar, which were labelled monticola, but which without hesitation I refer to asaluensis. One of these is composed of twelve whorls and measures 24 × 4 mm, while the other, which is a trifle more ventricose, has only eleven whorls. and attains a length of but 21 mm, although its diameter reaches The Theobald collection, on the other hand, was found to contain a shell labelled "bacillum, Theobald (non Benson)" from the Khasi Hills, which also portains to the present species It has twelve whorls and is a trifle more ventricose than the type. for although its length is 22 min., its diameter attains 4.75 mm

286. Clausilia loxostoma, Benson

Clausilia lorostoma, Benson, J A S B v, 1836, p 353, Pfeisser. Mon Helic Viv u, 1848, p 404, Hanley & Theobald, Conch.

Mon Helic VIV II, 1848, p 404, Hunley & Incording, Contained 1870, pl 24, fig 7

Clausilia bengalensis (v d. Busch), Pfeisfer, Symb II, 1842, p 60, Kuster, Conch-Cab, Clausilia, 1847, p 24, pl 2, figs 11-13

Clausilia (Phædusa) loxostoma, Adams, Gen Rec Moll II, 1855, p. 184, Pfeisfer, Malak Blatt II, 1856, p 180, Blanford, J A S B xli, 1872, p 201, pl 9, fig. 6, Stoliczka, tom cit p 208, Nevill, Hand List, 1, 1878, p 184.

Clausilia (Phædusa (Pseudonenia)) loxostoma, Boettger, Bei Offenbacher Van Naturw 1878, Mitt. p. 55. Pfeisfer & Clessin.

Offenbacher Ver Naturw 1878, Mitt p. 55, Pfeister & Clessin, Nomencl Helic Viv. 1881, p 391

Original description - Testa sinistrorsa, fusiformi, medioventricosa, corneo-grisescente; anfractibus, convexis, lævigatis, strus obsoletis, suturis confertissime crenulatis, apertura elongata, obliqua, bi-plicata, supra angustiori, infra dilatata, peristomate reflexo; columella præarcuata

"Long. 0 85 poll" [21 5 mm] (Benson)

Hab. India: Sylhet (Benson), Bengal (Pferffer), Terra Ghat (Godwin-Austen, Theobald), Naga Hills (Beddome), Cherra-

poonjee, Assam (Cantor; native collector, my collection)

"Out of a collection of 32 European Clausilia I find none with a similar obliquity of mouth, from which character I have named The outer hp projects beyond the plane of the aperture. The crenulations of the sutures differ altogether from the papillary appearance which is common to several species, such as papillaris, alboguttata, etc., and they are not elongated as in C. mtida " (Benson)

Nevill (Hand List, 1, p 184), mentions but does not describe a var. striatacostata collected by Lt -Col Godwin-Austen at Teria Ghat, while Stoliczka states that "a white solid variety occurs on the Khasi Hills, in form it tolerably agrees with Blanford's fig 6 b, plate 9, some specimens are, however, still a little thicker, and the transverse costulation on all the whorls is very distinct, while the crenulation along the suture is generally not so coarse as in typical loaostomu, though evidently stronger than

in asaluensis, which latter also differs by a more slender shape and smaller aperture" This form is referred to by Clessin as var. solidior, Stoliczka (Nomenci. p. 391), although Stoliczka did not so name it.

Blauford states that the species varies considerably in form, some specimens being much more fusiform than others. figures three varieties, of which he considers the first as the He further states that "the locality usually typical form assigned to this shell, Bengal, conveys a false impression, as neither this nor any other Clausilia is found in the plains of India Teria Ghat, the locality mentioned in the 'Conchologia Indica,' is at the southern base of the Khasi Hills, and the shell is found at many places along the range, from the base up to a height of. I believe. 4000 or 5000 feet Major Godwin-Austen sent me this species from Habiang on the Khasi plateau. I do not know if C loxostoma occurs also on the northern or Assam flank of the range. I have never seen specimens from any place in that direction, and as the chimate is much drier, many of the shells common on the southern watershed are wanting to the north"

When describing Cl bengalensis in 1842, Pffeifer appears to have been unaware of the fact that Benson's species, published in 1836, was identical. In 1848*, however, he recognized that the two were inseparable, and he relegated bengalensis to the synonymy of loxostoma.

The crenulations at the suture are rather distant in some specimens and the shell varies, not only in form, as referred to by Blanford, but also in size. A couple of shells from the Naga Hills, having nine whorls, measure 23×5 mm and 25×55 mm. The palatal folds—not mentioned by Benson—are five or six in number, and are distinctly visible from the aperture. Again, three shells from Teria Ghat, in the Theobald collection, composed of $9\frac{1}{2}$ whorls, measure 245×525 mm. On the other hand, some shells from Cherra-poonjee collected by Cantor, and now in the British Museum, only reach a length of 205 mm.

287. Clausilia nevilliana, Mollendorff.

Clausilia nevilliana, Mollendorff, J. A. S. B. h., part 2, 1882, p. 11, pl. 1, fig. 11, Godwin-Austen, P. Z. S. 1895, p. 443

Original description — "Testa elongato fusiformis, subtiliter oblique striatula, fusca, nitidula; anfr. 10 convexiusculi, apertura mediocris, fere verticalis, elongato-piriformis, sinulo recto perlongo, peristoma continuum, solutum, tenue, brevissime expansum, superne profunde sinuatum fere angulatum Lamella supera obliqua, marginalis, valida cum lamella spirali continua, infera a supera value iemota, spiraliter recedens, brevissime conspicua.

Plica principalis longa, palatales dum majores profunda, ventrales (antice intuenti supra aperturam conspicum), lunella nulla Clausilium? (non vidi)

"Alt. 20, lat. 4, apert. long. 4, lat. 3 mill" (Mollendorff)

Hab Nicobar Islands . Kamorta (Roepstorff)

"Nearly related to Cl javana. Pfr, and should find its place in Bottger's second section of Phædusa (Pseudonema), and in the fifth subgroup of Cl javana"

I have not seen this species, but judging from the figures it appears to have a much more obtuse apex than Clausilia wueller-

storffi, also a Nicobar form.

288 Clausilia shanica, Godwin-Austen

Clausilia (Pseudonenia) shanica, Godwin-Austen, P. Z S 1888, p. 244

Original description.—"Testa breviter rimata, fusiformi-clavata, corneo-grisea. solidula; spira concavo-turrita, valde elongata, apex minutus, acutissiinus Anfr 13½, lentissiine accrescentes, convexiusculi, sutura impressa disjuncti, subtiliter striati, ultimus penultimo parum major, subtus leviter attenuatus, cervice rotundatus. Apert parva, obliqua, late piriformis; perist. continuum, breviter solutum, expansiusculum Lamellæ modicæ, compressæ, approximatæ; supera marginalis, parum alta, intus humilima, cum spirali ut videtur continua; infera sublimis, subhorizontaliter



Fig 111 — Clausilia shanica (Type specimen.)



Fig 112 - Clausilia shanica

in mediam aperturam prosiliens, antice in denticulum desinens, a basi intuenti valde spiraliter torta; subcolumellaris subemersa, oblique intuenti distinctissima. Plica principalis profunda, lateralis, in apertura antice vix conspicua, palatales 2, altera supera, principali approximata et parallela, altera infera cum clausilio perspicuo lunellum lateralem, magis minusve distinctum, fingente."

"Alt 19½, diam 4 mm.; altrapert. 3½, lat apert 2¾ mm."

Hab. Burma near Pingoung, Shang Hills, 2500 feet (Boettger)

It would appear that the foregoing-description is the joint

It would appear that the foregoing description is the joint production of the late Professor Oscar Boettger and Mr. John Ponsonby, for Lt-Col. Godwin-Austen places it in inverted commas, and adds "This description is somewhat amended by

Mr. Ponsonby from one by Dr. Boettger, who considered it to be allied to C affinis of the Naga Hills On comparison it proves

to be very different in every way."

In fig. 112 a specimen in the British Museum from the Shan States is delineated, fig 112 b showing the inside of the last whorl with the pulatal place in situ, while fig 111 shows the type, which has the apex broken off.

289 Clausilia wuellerstorfi, Zelebor.

Clausilia willerstorfi, Zelebor, Verli K.K. Zool-Bot Ges xvii, 1867, p 806, Pfeisfir, Mon Helic Viv vi, 1868, p 411

Delima wultenstorffi, Frauenfeld, Verb K K Zool Bot Ges xix, 1800, p. 875.

Claunha (Pheedusa) (Hemphaedu a)) scüllerstorfi, Boettger, Ber Offenbecher Ver Nature 1878, Mitt p. 50, Pfeister & Clessin, Nomeral Helia, Viv 1881, p. 301

Ciaurilia (Phaedura) willerstorff, Godwin-Austen, P.Z S 1895,

p 44%

Original description — "T vix rimata, fusiformi-turrita, tenuis, confertin oblique striats, sericins, pellucida, rufo cornes; spira sensim attenuis, vertice obtasulo, sutura subsimplex, antre modice convexi, apicales lavigati, ultimus basi rotundatus, antice dense costulato-viriatus, apertura vix obliqua, subtriangulari-piriformis; lamellæ parvula, supera marginalis, infere substricte adscendens, lunclis nulla; plica palatales 3, suprema elongata,



Fig. 113 - Claunita waellerstorfi

seconda mediocris, tertia bresis, subcolumellaris inconspicua; perist continuum, bresiter solutum, superno cum lamella supera sinulum rotundatum form ins, undique breviter exprisum, margino externo fere rectilinerii

"Long 19, diam. 43 mm, aperture long 12, lat 31 mm." (Zelebar.)

Hab. Nicobar Islands (Novara Exped), Kamorta, Nancoury

(Godwin-Austen)

This appears to be a rare shell, the only specimen I have seen being the type, which is in the Vienna Museum, and has been kindly lent by Dr Sturany. I avail myself of the opportunity to give a figure of it, the species not having been hitherto illustrated. The shell is not quite mature, the peristome having

only just been formed, and the margins are consequently not thickened or dilated, while there is a sinus at the upper parietal fold. The walls of the shell also are thin and translucent

290 Clausilia nicobarica, sp. n

Shell rimate, fusiform, fuscous, very closely invested with fine slightly wavy striæ, more prominent and wavy on the last whorl, and showing traces here and there of indistinct spirals. Spire turreted, gradually attenuated, the sides almost straight; apex acute; suture superficial. Whorls 10½, slightly convex, the last considerably narrower than the penultimate. Aperture oblique, the basal margin curving forward, pyriform. Parietal folds divergent, the upper interrupted, rather slight and low; the lower more elevated and stouter, deflexed towards the right margin, not reaching the edge of the peristome. Palatal plicæ two, the upper long, parallel with the suture; the lower close to the upper, short, curved. Peristome solute, the margins expanded and



Fig 114 - Clausilia nicobarica

reflexed, scarcely thickened, left margin descending obliquely outwards, parietal margin without a sinus at the upper fold.

Long 24 5, diam 52 mm.

Hab. Nicobar Islands Type in Mr. Leman's collection.

The shell upon which this new species is based occurred in the Beddome collection, and was labelled wuellerstor fi, but it is quite distinct. It differs in being darker, more solid and opaque, and is also considerably larger, although it only possesses one half whorl more than wuellerstorfi; the aperture is larger and of a different shape, the left margin descending outwardly, besides being obliquely directed forward below, whereas in its ally it is directed backwards. The parietal margin of the peristome has no sinus at the upper fold, the latter, moreover, being interrupted, while the lower told approaches nearer to the upper, is stouter and more elevated, and obliquely deflexed towards the right margin, but does not reach the edge of the peristome, as is the case in the other species. Lastly, there are only two, instead of three, in tatal plice.

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Subgenus GARNIERIA, Bourguagnat

Garmeria, Bourgingnat, Ann Sci Nat ser G, v, 1877, art 1, p 2, Gredler, Drei Neue Clausilia-Arten and China, Boren, 1883, p 1 (as section of Charella), ibid, Jahrb Ibiuts Malak Ges xi, 1884, p 147. Mollendorff, op cit xiii, 1886, p 207, ibid, Nachr Diuts Malak Ges xxx, 1802, p 77 (as subgenus of Clausilia)

Trr. Chauxilia monho's, Picifier

Range Burms, Tarther India, China.

Last whorl produced, with the umbilical shit above the parietal margin of the peristone, which is solute and more or less horizontal; aperture wider than high, with extended wing-like margins. Clausiliam visible from the aperture, more or less doubled on itself lengthwise, forming a deep gutter, the proximal and truncate with a slight indentation (mondial) or tongue shaped with a more or less shallow groose, the proximal end pointed and faintly tubercled (ardonniana, orientalis, tuba), sliding over the columellar fold, not between the columellar and subcolumellar folds or only partly so. Upper palatal plica, which is comparatively short, and

lunella visible from the aperture-

Bourguigns' considered the clausilium of C. mouleti so fundamentally distinct from that in typical Clausilia, that he created a separate genus for the reception of this and a few allied forms. While admitting that this structure in mouleti is very remarkable it should be borne in mind that it is only this species which, so far as known at present, exhibits this extreme form of clausilium and that the other species form connecting links with the normal character in this respect, and although the produced list whorl, the transversely dilated, almost subquadrate aperture, the almost horizontal and solute parietal margin and the wing-like expansion of the other than margins of the pensione, constitute well-marked features, sufficient to warrant the species thus characterized being segregated from their whilom congeners, I do not regard them of generic value. Gredler and Mollendorff were evidently of the same opinion, a fact which induces me all the more readily to reduce Garmeria to subgeneric rank.

Only two known species occur in Burms, while Mollendorss in 1898, in addition inumerated ten species trackelostropha, Mollendorss, and fuchsi, Gredler, from China, schomburgi, Schmacker & Boettger, from Haman; ardonniana, Hende, orientalis, Mabille, and horrida, Mabille, from Tonkin, mouhoti, Pfeisser, massici Morlet, and dautzenbergi, Morlet, from Laos and Cambodia, rugifera from Annam To these may be added dorri, Bay & Dautz, giandi, H. Fischer, and messageri, Bay & Dautz, from

Tonkin

291 Clausilia tuba, Hanley.

Clausiha tuba, Hanley, A. M. N. H. ser 4, 1, 1868, p. 343, Hanley & Theobald, Conch. Ind. 1870, pl. 24, fig. 9, Sowerby, Conch. Icon. xx, 1875, Clausilia, pl. 8, fig. 72. Pfeiffer, Mon. Helic. Viv. viii, 1877, p. 540, Boettger, Bei. Offenbacher Ver. Nature. 1878, Mitt. p. 80 (inc. sed.)

Clausilia (Phaedusa Hemiphaedusa)) tuba, Pfeisei & Clessin,

Nomenci Helic Viv 1881, p 394

Clausika (Garnieria) tuba, Mollendorff, Jahib Deuts Malak Ges xiii, 1886, p 207, ibid, Nachr Deuts Malak Ges xxx, 1898, p 77

Original description — "Testa (pro genere) magna, subcylindraceo-fusiformis, apicem versus cylindracea, albido-cornea, unicolor, tenuis, subdiaphana, haud rimata, lineis elevatis vix continuis et (præsertim in anfractu ultimo, ubi remotioles hunt) oblique corrugata Anfractibus 10-12, sutura profunda et minime crenata divisi; apicales unice convexi, subæquales, cæteli convexi, et satis rapide crescentes, penultimus major, altior, ultimus curvatus, verticaliter descendens, infra suturam

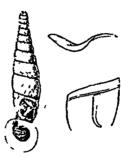


Fig 115 — Clausilia tuba

submarginatain subcoarctatus, denique insigniter dilatatus, bisi rotundata nequaquam cristatus. Apeituia peimagna, soluta, porrecta, subcordato-rotundata, undique patentissima. Peristoma continuum late expansum, lamella supera conspicua, angusta, arcuatim subverticalis, lamella infera adjacens, obliqua, magisque profunda, plica subcolumellaris parvula, verticalis, plica palatalis (si sit ulla) labrum haud attingens, lunella opacitate conspicua

"Long 1½ poll [=31 5 mm]" (Hanley)

Hab Burma Upper Salween Valley, Shan States (Fedden)

Apparently a rare species. It resembles an exaggerated C mason with wing-like margins of the peristome, but the subcolumellar fold does not reach so far and is placed lower on the
columellar margin. The lunella is almost united to the palatal
plica above and to the subcolumellar fold near the inner edge
of the peristome below. Hanley stated that it most closely resembles the American C epistomium, not a very happy comparison.
It certainly has much closer affinity with C mason, while it also

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bears some resemblance to C. orientalis. Mab but is less inflated I have only seen two specimens which are about the middle in the British Museum. One of these is the type figured in Conch. Ind . measuring 33 5 x 5 75 mm , presented by Mr. Harvey who acquired the Hanley collection by purchase Hanley's figure is enlarged (41 mm length), although there is no indication of this fact on the plate. The other shell (here figured with its detached clausilium and the palatal plice) is in the Theobald collection and is composed of 121 whorls, measuring 32 × 5 75 mm. The latter is a very fine specimen, possessing a peristome with more expanded margins

292. Clausilia masoni. Theobald

Clausilia maroni, Theobald, J. 1. S. B. xxiii, part 2, 1864, p. 246, Harley & Theobald, Couch. Ind. 1870, pl. 21, fig. 8. Sowerby, Couch Iron xx, Clausilia, 1875, pl 8, hg 69, Pfeiffer, Mon Helie Vii viii, 1-77, p 540

Clausha (* Nema) masoni, Blanford, J. A. S. B. xh, 1872, p. 206, pl. 9, fig. 18

Charrier (Phaedesa) mason Nevill, Hand List, 1, 1878, p 181 Clausilia (Phaedusa (Hemiphaedusa)) masom, Pfeifler & Clessin,

Nomenel Helie Viv 1881 p 304 Clausdia (Garmeria) masom, Mollendorff, Jahrb Deuts Malak Ge- xiii, 1886 p 207, ibid, Nachr Deuts Malak Ges xxx,

1898. p 77

Orie ial description —" Testa arcunto rimata, susiformi, tenui, co-tulato-striata, pullide castanen. Apice intacto. Sutura ex-Anfractibus decem, sub-planatis, ultimo angustiore, supra aperturam fortiter striato, juxtaque suturain fossa, laminæ interioris cursum monstrante, notata Lunella distincta, interdum Lamelles quinque, duabus parietalibus tenuibus, distinctis, intus conniventibus, reliquorum binis fortibus ad aperturam divergentibus, tertia post lunellam valde tenui, inconspicua 10tundato-auriformi-soluta Peristomate expanso, Apertura reflexiusculo

"Longit 21 ad 29 mm lat 1 ad 5 mm" (Theobald)

Hab Burns Tonghu (Theobald)

In the present species three folds are visible on the upper or parietal margin of the peristome, for in addition to the two parietal folds, present in most species, the subcolumellar fold here also reaches the incide margin, while the upper pairtal plica runs Of the two parietal folds the upper close to the peristome terminates at the outer edge of the peristome, but the lower does not reach quite so far The clausilium is likewise visible for the greater portion of its length upon looking into the aperture Clausilia masoni is characterized by the rather distant, fine, plicate-structe ribs, which are especially prominent on the latter half of the last whorl.

Subgenus OOSPIRA. Blanford.

Oospira, Blanford, J. A. S. B. xli, 1872, p. 205 (type Clausilia philippiana, Pfeister), Boettger, Paleontographica, 3rd suppl. 1877, p. 64 (as section of Phaedusa), ibid., Ber Offenbacher Ver. Naturw 1878, Mitt p 56, Pfeiffer & Clessin, Nomencl Helic Viv. 1881, p 392.

Type, Clausilia philippiana, Pfeiffer

Range Burma.

"Shell with but few whorls, usually five or six, and of a peculiar more or less oval form with a very blunt apex. Lunule

wanting, palatal plaits as in Phædusa.

"The known shells of this section are solid deeply coloured Clausilize, smooth or with very slight sculpture So far as is bitherto known, the type is peculiar to Martaban and Tenasserim." (Blanford.)

293 Clausilia bulbus. Benson. -

Clausilia bulbus, Benson, A. M. N. H. ser 3, 1, 1863, p. 321, Pfeiffer, Mon. Helic. Viv. vi, 1868, p. 409, Hanley & Theobald, Conch. Ind. 1870, pl. 24, fig. 5, Sowerby, Conch. Icon. xx, 1875, Clausilia, pl. 6, fig. 51
Clausilia (Oospua) bulbus, Blanford, J. A. S. B. xh, 1872, p. 206,

pl 9, fig 16

Clausilia (Phaedusa (Oospua)) bullus, Boettger, Ber Offenbacher Ver Naturw 1878, Mitt p 56; Pfeissen & Clessin, Nomencl Helic Viv. 1881, p 392

Original description —" C testa sinistrorsa, vix rimata, oblongoobovata, pupiformi, regulariter oblique striata, rubenti-ferruginea; spira obovata, superne ventricosa, versus apicem obtusum concamerata, sutura impressa, anfractibus 5½, convexiusculis, primis rapide accrescentibus, antepenultimo tumido, penultimo angustiore, pone aperturam obliqua, oblique auriformi, peristomate continuo, margine late expanso, reflexiusculo, albido-rubente, lamella superiore acuta, prominente, longe, intus intrante, spirali, infera forti, oblique spiraliter ascendente, subcolumellari immersa, plicis palatalibus 7, superiore valde elongata, late electa, intus cum lamella superiore rimam angustam efformante, 6 inferioribus brevibus, subparallelibus, lunella nulla

"Diam anfract antepenultimi 9, ultimi supra aperturam 5, axis 23 mill.; ap. (oblique), longa 8, lata 7 mill." (Benson)

Hab. Burma: Banks of the Attaran River, near Moulmain

"This most singular form in the genus was found by Col. Robert Gordon. The bulbous pupiform figure of the shell at once distinguishes it from Cl philippiana, Pfr., an inhabitant of the Farm Caves, as well as from any other known species The upper lamella runs spirally up the aperture, forming a narrow slit between it and the upper knife-like plica" (Benson)

Clausilia bulbus resembles a large orata, but the strice are much coarser and further apart, and there are a few coarse distant spirals, while the last whorl becomes more attenuated behind the peristome. The only shell of bulbus I have seen is from Moulmain in the National collection; it is 25 mm. in length, the penultimate whorl measuring 9 5 and the last whorl 5.5 mm. This species, C. nhi/mpiana and C. or ata constitute a natural group, characterized by the very convex spire and the very obtuse apex.

294. Clausilia philippiana, Pjeisser.

Clausilia philippiane, Pfeiff r., Zeits Malak iv, 1847, p 69; ibid, Mon Helic. Viv ii, 1849, p 423 ibid., Conch. Cab Clauslia, 1850, p 100 pl 11, figs 7-2, Hanley & Theobald, Couch. Ind. 1875, pl 118, fig 10; Sowerby, Conch. Icon xx, 1875, Claudia,

Ciausina (Phedusa) ; halippiana, Adams, Gen Rec. Moll. 11, 1855, p 184 : Pfeiffer, Malak Blatt 11, 1856, p 180, von Martens, the Heliceen, ed 2, 1860, p 275

Claurha (Phedusa) philippiana, Stoliczka, J. A. S. B. xl. 1871.

p 174, pl 6 figs 7-10 (snatomy).

Cleusiles (Ospies) philippiena, Blanford, J. A. S. B. xh, 1872, p. 205, pl. 9, fig. 14; Kobelt, Conchyl. Buch, ii, 1878, p. 289, pl. 86, fig. 29 Tapparone Canefri, Ann. Mus. Civ. Genov., ser 2, vii, 1889, p. 329

Clausilia (Phaedusa (Ospira)) philippiara, Boettzer, Ber Ofen-bacher Ver Naturw 1878, Mitt. p 56; Pfeisser & Clessin,

Nomenci Helie Viv 1881, p 392

Original description -- "T. vix rimata, abbreviato-fusiformis, crassa, solida, subtilissime striatula, castanea; spira ventrosa, apice obtusiseima; enfr. 6, primi 3 planiusculi penultimus convexus, ultimus angustior, basi rotundatus, apertura verticalis, oblique semiovalis, laniellae validae, approximatae, plica luncta imperfecta vel obsoleta, palatalis I longa, sutume parallela, columellaris immersa; perist. crassum, continuum, superne subaduatum marginibus late expansis, columellari perobliquo, externo strictiusculo.

"Long. 21, diam 7] mill; ap. oblique 7 mm. longa. 5 lata"

(Pfeiffer.)

Hab Burma: Mergui (Philippi); Farm Caves, Moulmann (Stoliczka, Theobald, Hungerford, Fea); Attaran Valley and Tenasserim (Theobald) Mergui Archipelago: Sullivan Island

(Anderson fide Tapparone Canefri)

Clausilia philippiana forms a connecting link between C. bulbus and C. ovata, differing from the latter in the length being greater in proportion to the diameter, in the upper part of the spire being more slender, and in the wider aperture, while it is decidedly less ventricose about the middle than the former. The palatal plicae vary from seven to mine in number, the first being very long, the second about half the length of the first, and the remainder very short, they are all nearly parallel

The specimen figured by Hanley has been presented to the British Museum by Mr Harvey, it is composed of 61 whorls and measures 26 × 8 25 mm Three shells in the Cuming collection. from Moulmain, range in size between 225 mm and 23 mm and in diameter from 7.75 mm to 8 mm. The Theobald collection contains shells also from Moulmain and Mergui, of 6 and 64 whorls, measuring 215×75 and 25.5×8 mm respectively. Lastly some specimens in the Beddome collection are blackish brown in colour, varying in length from 21 5 to 23 5 mm, and in diameter from 6.25 to 7.5 mm

295 Clausilia ovata, Blanford.

Clausika (Oosmra) ovata, Blanford, J A S B vh, 1872, p 206,

Clausina (Cospira) ovata, Islanicia, J. A. S. B. Vii, 1872, p. 206, pl. 9, fig. 17, Nevill, Hand List, 1, 1878, p. 183
Clausina ovata, Hanley & Theobald, Conch. Ind. 1875, pl. 118, fig. 4, Sowerby, Conch. Icon. vv., 1875, Clausina, pl. 7, fig. 60, Pfeisfer, Mon. Helic. Viv. viii, 1877, p. 469
Clausina (Phacdusa (Cospira)) ovata, Boettger, Ber. Offenbacher. Ver. Naturw. 1878, Mitt. p. 56, Pfeisler. & Clessin, Nomencl. Helic. Viv. 1881, p. 392

Helic Viv 1881, p 392

Original description - "Testa vix subrimata, elongata-ovata. pupiformis, intense rufo-ferruginea, regulariter confertuique striata, spira tumida, apice convexo, sutura parum impressa Anfr 55 convexiusculi, primi rapide accrescentes, antepenultimus maximus, penultimus vix minoi, ultimus ad basin rotundatus Apertura auriformis, fere verticalis, juxta anfractum penultimum repanda, lamella supera acuta, antice validiore, feie verticali, infera stricta, lunella nulla, plicis palatalibus 7, supera producta, in fauce aperturæ conspicua, sutuiæ parallela, secunda curvata, cæteris brevibus obliquis

"Long 19, diam 7 mm; apert oblique 6 longa, 45 lata"

(Blanford.)

Hab Burma Nattoung near Moulmain (Theobald), Attaran Valley (Hungerford)

"It is more ovate than C. Philippiana and C. vespa, smaller

and less turned than O bulbus" (Blanford)

In addition to the differentiating characters alluded to by Blanford, C. ovata has a shorter spire which increases more suddenly than in philippiana, the whorls are less tumid, and it possesses fine spirals, which are lacking in its ally. There are some shells in the British Museum from Pathingtoun, Attaran Valley, measuring 18 × 6 75 mm, others from Nattoung, the type locality, and Moulmain have the spire still more convex, the former having a diameter of 7 mm with a length of 1775 mm, and the latter being 18 × 8 mm The shell figured by Hanley is also in the National collection, having been presented by M1 Harvey, it measures 18×7 mm

296 Clausilia stoliczkana, Sykes

Clausilia (Oospira) vespa, Blanford & Stoliczka (non Gould), J. A. S. B. xii, 1872, pp. 205 & 209, pl. 9, figs. 15, 15 a Clausilia vespa, Pfeiffer, Mon Helic Viv viii, 1877, p. 468 Clausilia (Oospira) stoliczkana, Sykes, The Conchologist, 11, 1893, n 166

Original description —"Cl testa ovato-cylindrices, ad apicem obtusa, albida, medio subinflata, ultimo anfractu sensim attenuata, haud rimata, fusco-castanea, anfractibus sex, convexiusculis, sutura simpliciunctis, transversim oblique et confertissime striolatis, apertura subovata, postice rotundate subangulata, antice late sub-effusa, intus violaceo-rufa, peritremate modice expanso, interno oblique fere recto, libero; lamelle sub-parallele, fusce, ad marginem attingentes; plice palatales 8-9, suprema (principalis) longa, alteræ breviores et inter se valde inæquales

'Alt 25 millim, lat 7 millim; apert alt. 64 millim, lat.

5 millim " (Stoliczka) Hab Burma. Tavoy.

The above description of what Blanford and Stoliczka regarded as Gould's Clausilia vespa, is copied by Mr. Sykes, who considered that neither the description nor the figures represented Gould's He observes "The specimen figured by Mr. Stoliczka is, I believe, one which has been since received by the British Museum from Mr. Theobald There are two species in the British Museum under the name of vespa, Gould, one which I regard as really that species from the Hungerford collection, and the other from Mr Theobald, which I regard as the species and specimen

described and figured by Mr Stoliczka What the shell is which is figured by Dr Blandford [Blanford] as vespa is, the absence of description makes it hard to say, Dr. Blandford himself says it is hard to separate from philippiana, and it is probably only an elongated specimen of that species"

He states that Gould's description is very brief, which he then quotes, and continues "The description will not fit Mr. Stoliczka's shell, as in this latter the colour is not 'intense rufa,' the apex is blunt not 'anfr. apicalibus cuto descrescentibus,' i e, resembles the end of a cylinder rather than the point of a cone, no whorl can be said to be 'corpulentus,' the suture is not 'via marginata,' but simple, the aperture is not 'ovata' but subovate.

the lip is not 'late reflexus' or 'rufus'

"On the other hand, so far as it goes, Gould's description does fit the Hungerford shell, which is not very blunt in the apex like the others of the Oospira section, which is a dusky red, like philippiana, and has a very thick and expanded dark lip

"I therefore consider Mr Stoliczka's shell as not vespa, it is as far as I know, an undescribed species, and I adopt his description of it and call it Stoliczkana"

An examination of the shell in the Theobald collection, upon which Mr. Sykes has based his new species, has convinced me that

as regards outline, it fits Blanford's figure (fig 15) better than Stoliczka's (fig. 15a) but in the former the strice appear more distant, and it shows rather more sinus at the upper parietal fold

297. Clausilia vespa, Gould

Clausilia vespa, Gould, Proc Boston Nat Hist Soc vi, 1859, p 13, ibid, Otia Conch 1862, p 220, Pfeiffer, Mon Helic Viv vi, 1868, p 409, Sykes, The Conchologist, ii, 1893, p 166, 3 text-figures.

Clausilia (Oospu a) vespa, Nevill, Hand List, 1, 1878, p 183

Original description:—"T: solida, sinistrorsa vespæformis, deflecta, lævis, intense rufa. anfr. 6, anteriori raptim attenuato, proximo corpulento apicalibus cito descrescentibus, sutura impressa vix marginata, apertura ovata; columella biplicata, peritiemate late reflexo, rufo.

"Long. 1 [=25 25 mm], lat $_{10}^{\circ}$ poll [=7 5 mm.]" (Gould) Hab Burma Tavoy (Mason), Hooden Koo, Salween Valley

(Hunger ford); Tenasserim (? Mason).

Mr. Sykes, as already stated under C stoliczkana, has pointed out that the shell described and figured by Stoliczka and Blanford as C vespa—which he believes has been received by the British Museum from Mr. Theobald—differs in several respects from Gould's species, and he regards it as a new form. On the other hand a shell in the British Museum, from the Hungerford collection, he believes to be the true vespa and adds a diagnosis, based upon this specimen, to supplement the very brief description by Gould—His diagnosis is as follows.—

"Cl testa solida, sinistrorsa, fusiforinis, medio inflata, apex obtusiuscula, subtile et indistincte decussata, haud nitida, intense rufa, ad apicem pallidior, anfr. 6. apicales cito decrescentes, penultimus et ante penultimus inflati, corpulenti, sutura implessa vix marginata, apertura ovata, peritremate late et valde reflexo, rufo; lamella superior valida, obliqua, rufa, fere ad marginem attingens, l inferior valida rufa subparallela, plicæ palatales 5-6, suprema (principalis) longa, secunda bievior, descendens, reliquæ

parvæ, subæquales descendentes.

"Alt 27 millim., lat. 8 millim., apert alt 7 millim., lat

 $5\frac{1}{2}$ millim

section both on the ground of shape and its sculpture (an indistinct decussation) and Cl stoliczkana should take its place"

(Sylves)

Through the courtesy of Dr John M Clarke, the Director of the State Museum of Albany, NY, I have been able to examine one of the two specimens of Gould's C. vespa, and I am in a position to confirm Mr. Sykes' surmise that the shell figured as vespa by Stoliczka is quite different from Gould's species. The specimen sent to me by Dr Clarke is smaller than the one in the Hungerford collection, figured by Mr Sykes, measuring length 25,

breadth 76 mm and, except in being rather weatherworn, it completely resembles the latter. Dr. Clarke informs me that the second Gouldian specimen is almost exactly like the one sent, except that it is a trifle shorter and stouter, measuring 24×8 mm, the last whorl especially being proportionately shorter and less contracted, although there is very little difference in the apertures. I have taken the opportunity of giving an illustration of Gould's shell

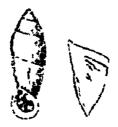


Fig 116 — Clausilia respa

I am unable to follow Mr. Sykes when he states that C vespa must be removed from the Ospira section, for in spite of the fact that in establishing this section Blanford described the apex as very blunt, and that vespa has the apex rather neute, the whole aspect and consistency of the shell of vespa resemble those of the other members of the group to such an extent that I prefer to retain it as a member of the section, abnormal only in the apex.

Subgenus CYLINDROPHÆDUSA, Boettger

Cylindrophaedusa, Boettger, Palmontographica, 3rd suppl 1877, p 64, Ber Offenbacher Ver Naturw 1878, Mitt. p 42 (only species Clausitia cylindrica), Pfeiffer & Clessin, Nomencl Helic Viv 1881, p. 392

TYPE, Clausilia cylindrica, Pfeiffer.

Range, India

Principal fold long, palatal plica 2 acquidistant, deep seated Lanella absent. Upper parietal lanella oblique, marginal, contiguous with the spiral fold, lower parietal lanella almost straight, ascending obliquely, becoming bifurcate inside. Subcolumellar fold very deep-seated, not visible from outside. Aperture small, rhomboid-ovate, the margins of the peristome scarcely thickened and slightly reflexed. Shell small, usually decollate, almost cylindrical, with slowly increasing whorls, corneous, striated or costulate-striate.

298 Clausilia cylindrica, Pfeiffer.

Clausilia cylindrica (Gray), Pfeisfer, Symb Hist Helic in p 93, ibid, Mon Helic Viv ii, 1848, p 428, ibid, a 1858, p 590, ibid p 349, p 95, Küs Cab, Clausilia, 1850, p 101, pl 11, figs 12-16, Blanford, J A. S B xli, 1872, p 199, pl 9, hg 1, Stoliczka, tom cit p 207, Sowerby Conch Icon xx, 1875, Clausilia, pl 2, fig 18; Theobald, J A S B xlvii, 1878, p 146, ibid, op cit 1, 1881,

Clausilia (Phaedusa) cylindi ica, Nevill, Hand List, 1, 1878, p 185 Clausilia (Phaedusa (Cylindi ophaeilusa)) cylindi ica, Boettger, Ber Offenbacher Vei Natui w 1878, Mitt p 57, Pfeister & Clessin, Nomencl Helic Viv 1881, p 393 Clausilia elegans (Hutton MS) Pfeiffer, Zeit Malak. vi, 1849,

p 95 (as synonym of C cylindi ica)

"T. subrimata, adulta plejumque truncata, subcylindrica, oblique striata, nitide cornea vel rufescens, sutura submarginata; anfr superst 6-7 subaequales, ultimus antice costulato-striatus, basi rotundatus, apertura subverticalis, pyriformis, lamellae parvulae, conniventes, infera substricte ascendens, superne furcata, lunella nulla; plicae palatales 3 parallelae, summa elongata. reliquae breves, subcolumellaris inconspicua, perist continuum, vix solutum, albidum, breviter reflexum.

"Long (trunc.) 13, diam. 3 millim., ap 3 mm. longa, 2 lata"

(Pferffer, 1853.)

Hab India: Landour (Gray), Mussoorie (Beddome), Dhaimsala, east of the Ravi (Theobald, 1878), Tandiani and Mari [Murree], Punjab (Theobald, 1881), Murree (Stoliczka), Nami Tal and Simla (Stoliczka, Oldham), Tezpui, Assam (Stoliczka)



Fig 117 - Clausilia cylindiica

"The figure in the 'Conchologia Indica' is that of a specimen which, although adult, has retained its apex. This is a very lare The figure now given represents the shell as it is occurrence

usually found.

"Three palatal plants, the upper elongate, are always present, and beneath them there is occasionally to be found a rudi-The characters both of the shell and of the mentary lunella internal plication differ widely from those of typical Phædusa, in which sub-genus I do not think that the present species can be included. It stands by itself, and I am inclined to look upon it as the type of a peculiar section " (Blanford)

The species seems to be fairly common since I have seen large numbers in various collections As mentioned by Blanford, the shells are nearly always decollated It is rather surprising that in drawing attention to the specimen figured by Hauley & Theobald he failed to notice that the figure in question does not represent cylindrica, but quite a distinct form which has since been separated and named Clausilia turritella by Sowerby. Amongst the numerous specimens of C cylindrica examined by me the only entire shells I have seen are two in my own collection, which were acquired many years ago amongst a miscellaneous lot at a sale. One of these is now figured. It is composed of 14 whorls, the first seven being opaque white, owing to the withdrawal of the animal from that portion of the shell. That this is a case of true decollation I have satisfied myself by examining numerous shells with six or seven whorls, in each case the newly formed apex could distinctly be seen

299 Clausilia turritella, Sower by

Clausilia cylindrica, Hanley & Theobald (non Pfeisser), Conch. Ind. 1870, p. 12, pl. 24, fig. 4. Clausilia turritella, Sowerby, Conch. Icon. xx, 1875, Clausilia,

Clausilia turritella, Sowerby, Conch. Icon. xx, 1875, Clausilia, pl. 7, fig. 65

Clausilia elegans, Hutton, MS

Original description — "Shell yellow, very narrow elongated, pyramidal, whorls 14, slowly increasing, rather convex, last oblong, aperture oblong, rather square, with a single plant over the columella, columella straight" (Sowerby)

Long 16 75 mm (ex 200n)

Hab India, Landour,

The shell from Landour figured by Hanley & Theobald as Clausilia cylindrica of Gray, copied by Sowerby, is altogether different from that species as described and figured by Pfeiffer, so that Sowerby was quite justified in giving it a new name. In turritella the whorls are more convex, the aperture is much narrower and higher, and the shell much paler in colour. It is rather unfortunate that the whereabouts of Hanley's specimen is unknown. It was not amongst the shells from Hanley's collection presented to the British Museum by Mr. Hanvey

Family ACHATINIDÆ

Subfamily ACHATININÆ

Genus ACHATINA, Lamaick

Achatma, Lamarck, Mem Soc Hist. Nat Paris, An vii (1799), p 75, Fischer, Man Conchyl 1883, p 486, Pilsbry, Man. Conch ser 2, xvii, 1904, p 1

TYPE, Bulla achatına, Linné

Range Tropical Africa (one species naturalized in India)
Shell ovate or oblong, with come spire and small apex, two or
three earliest whorls smooth, forming a trochiforin nucleus, obtuse

at the apex Aperture ovate, the outer lip unexpanded, columella concave or straight, truncate as though cut off below

Reproduction oviparous, the eggs small, oval and pale vellow.

numeious

300 Achatina fulica, Férussac.

Helia fulica, Férussac, Tabl Syst Limaçons, 1821, p 49 (p 53 of some editions), no 347 (nom nud), ibid, Hist Nat Moll pl 124 A, fig l, pl 125, figs 3-5

Achatina fulica, Deshayes, Anim sans vert ed 2, viii, 1838, p 297, footnote, Pieister, Mon Helic Viv ii, 1848, p 254

Reeve, Conch Icon v, 1849, Achatina, pl 2, fig 8, pl 3, fig 8b, Deshayes in Férussac, Hist Nat Moll ii, pait 2, 1851, p 162

Benson Journ Conclus vii 1858 p 266 Seminor Rosson Arch Bensou, Journ Conchyl vii, 1858, p 266, Semper, Reisen Arch Philippinen, Landmoll 1873, p 143, pl 12, fig 17 (anatomy) Nevill, Hand List, i, 1878, p 145, Kobelt, Ill Conchyl Buch, ii, 1878, p 262, pl 81, fig 1, Bourguignat, Moll Afrique Equat 1889, p 76, Pilsbry, Man Conch ser 2, xvii, 1904, p 55, pls 36, 37, Annandale, Rec Ind Mus i, 1907, p 176

Achatina (Achatinus) fulica, Pfeiffer & Clessin, Nomencl Helic

Viv 1881, p 266

Shell ovate-conoid, pale yellowish, streaked transversely with brown, somewhat glossy, more or less arregularly decussated with fine spirals, except on the last whorl Spire convex, suture impressed, apex acute Whorls 8, convex, the last nearly equalling half the entire length of the shell Aperture elliptic ovate, white or pale lilac within; peristome straight, acute, the margins counected by a callus on the parietal wall; columella slightly concave, truncate.

Length 94, diam. 45 mm, apert 48 mm (Calcutta specimens) India · Calcutta (introduced) '(Nevill) Madagascai :

Mascarenes: Sevchelles. Comoro Islands. Zanzibar

A native of Madagascar, Achatina fulica was, according to Lesson, introduced in Mauritius and Bourbon In addition, it has been recorded from the Seychelles, the Comoro Islands, and Although not being, strictly speaking, a native of Zanzıbar. India, it has been thought advisable to include it since it appears

to have established itself thoroughly.

The history of its earlier transport is not known, but Benson has placed on record how he carried living specimens from the Mauritius to Calcutta, where they were turned loose After his return to England he received news that it had multiplied in neighbouring estates and was spreading Hutton took some specimens from Calcutta to Mussoorie, where they continued to breed, but a severe winter exterminated them Dr Annandale reports that it is common in gardens in Calcutta and neighbourhood, and that it is said to be spreading in other parts of India Pilsbry figures a shell from the Botanic Gardens, Calcutta

SUBULINA 341

Subfamily STENOGYRINÆ.

Genus SUBULINA, Beck

Subulina, Beck, Index Moll 1837, p 76 (in part), Gray, P Z S. 1847, p 177, Herrmannsen, Ind Gen Malac ii, 1849, p 522, Pilsbry, Man Conch ser 2, xviii, 1906, pp 71, 220

Tipe, Bulimus octonus, Bruguière

Range Tropical America and Africa; one species—octona—introduced into India

"Shell imperforate at all stages of growth, narrow, turnted, or subulate, thin, corneous or brownish, usually more or less translucent, apex obtuse, rounded, the embryonic shell either smooth, plicate below the sutures or vertically ribbed. Last whorl angular or rounded at the periphery. Aperture small, oblique, ovate, the columella concave above, obliquely or absurptly truncate at base. Eggs

with a calcareous, oblately spheroidal capsule

"Beck originally proposed the name Subulina for the following species—(1) S cyanostoma Rupp, (2) turriellata Desh, (3) structella Rang, (4) malaguetana Rang, (5) monoceros Beck, (6) proping use Beck, (7) terebraster Lam, (8) octona Ch, (9) crotalariae Scham, (10) carinulata Beck, (11) pupaeformis Beck, (12) S? sericata Beck. The first species of the list was made type of Homorus by Albers, 1850, species 6, 10, 11, 12, are nude names, 7 is an Obeliscus, 2 and 4 are species of uncertain generic relationships; leaving species 3, 5, 8, 9 to represent the group of S octona Gray in 1847 and Herrmannsen, 1849, agreed in selecting as type of Subulina the commonest and best known species, S octona—a course approved by practically all later writers who have recognized the group? (Pilsbiy)

301 Subulina octona, Biuguière

Bulimus octonus, Bruguiere, Fincycl Méth, Vers, 1, 1789, p 325
Achatina octona, Gray, Ann Philos N s 1x, 1825, p 414, Menke,
Syn Meth ed 2, 1830, p 29, Potiez & Michaud, Galérie Douai,
1, 1838, p 129, pl 11, hgs 13, 14, Orbigny in Ramon de la
Sagra, Hist his pol nat. Cuba, Moll 1, 1841, p 168, pl 11,
figs 4, 6, Pfeitier, Mon Helic Viv 11, 1848, p 266, Reeve,
Conch Icon 1, 1849, Achatina, pl 17, fig 84, Sowerby, Conch.
Man 1852, hg 514, Pfeitier, Conch-Cab, Achatina, 1854, p 342,
pl 37, figs 19, 20

Subulina octona, Beck, Index Moll 1838, p 77, Adams, Gen Rec. Moll 11, 1855, p 110, pl 71, fig 3 a, Pilsbry, Man Conch ser 2, vviii, 1906, p 72, pl 12, figs 8, 9, p 222, pl 39, figs 28-37,

39, 40,

Stenogyra (Subulma) octona, Kobelt, Illustr Conchyl Buch, 11, 1878, p 276, pl 84, fig 29, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 326

Stenogya a octona, Peile, Journ Bombay Nat. Hist Soc A11, 1909, p 785
Subulina crotallaria (Schumachei), Morch, Journ Conchyl 1872, p 337

Original description: - "Bulimus, testa cylindrica, turrita, cornea,

anfiactibus octo, apice obtuso

"La coquille n'est point ombiliquée ni perforée, elle est cylindrique, tui iculée, iousse, transparente et composée de huit tours presque applatis, qui sont sepaiés par des sutures profondes. Le sommet de la spire est obtus ou arrondi, il est ordinairement plus transparent que les tours inférieurs et très fragile. Leur superficie est luisante et marquée de quelques stries longitudinales, écartées, qui sont les traces des accroissemens successifs de la coquille. Son épiderme est brun, mais facile à enlever, excepté dans les sutures ou il en reste toujours assez pour y paroitre comme une ligne spirale noirâtre. L'ouverture est ovale, une fois plus longue que large, elle est un peu oblique, arrondie à son extrêmité inférieure et rétrécie au bout supérieure. La lèvre droite est simple, ties mince et tranchante, la gauche manque tout-à-fait, mais sa région est lisse, très luissante et aussi diaphane que les trois derniers tours du sommet." (Bruquière.)

"Shell thin, translucent, yellowish corneous, turrited, almost regularly tapering to the obtuse summit, very glossy, rather coarsely and irregularly striatulate. Whorls 9, quite convex, separated by a deeply impressed suture, the first three turns of which are regularly crenulated by a border of short folds. On the later whoils it is also irregularly crenulate in places. Last whorl rounded Aperture oblique, ovate, columella concave

above, obliquely truncate at its base " (Pilsbry.)

Length 155-19, diam. 4-4-5 mm

Hab India · Tranquebar (Spengler fide Morch); Bombay (Perle,

Beddome coll) Ceylon (Collett).

"Reproduction begins before the shell has attained two-thirds its maximum size, and usually several eggs may be seen through the shell within the penultimate whori. The egg-capsules are hard-shelled, white and flattened, measuring 18×15 mm"

(Pilsbiy)

Subulina octona is certainly one of the most widely distributed molluses, being found not only in the Western Hemisphere, believed to be its original home, but also in the Eastern Hemisphere, having apparently followed in the wake of tropical and subtropical cultivation. Prof. Prisbry has examined numerous specimens from the West Indies, North and South America, West Africa, the Seychelles, Ceylon, Sumatra, and Ternate, and he is satisfied of their identity. The species has also been recorded from East Africa, Mauritius, many other East Indian islands, New Caledonia, and as far as the New Hebrides, while its occurrence in hot-houses in Europe and North America lends colour to the theory of its dispersal through cultivation.

Bruguierès description is not very clear and I have therefore added the diagnosis given by Pilsbry in his admirable account of the species. The bibliography covers more than two octavo pages, but I have limited myself to the principal references and those having any bearing on its occurrence in the Indian region.

The Beddome collection in the British Museum contains, amongst specimens from numerous widely separated localities, three shells from Bombay, composed of ten whotls and measuring

19 mm in length.

Genus BACILLUM, Theobald

Bacillum, Theobald in Hanley & Theobald, Conch. Ind. 1870, p. 17 (as subgenus of Achalina for A. obliusa, Blanford, and A. casiaca Benson), Pilsbry, Man. Conch. ser. 2, xviii, 1906, p. 1.

Tyre, Achatina casiaca, Benson

Range Eastern India

"Shell rather large, solid, imperforate, turrited, many-whorled, a little contracted near the obtuse, rounded summit, the embryonic shell cylindric, sculpture of vertical rib-strim beginning somewhere upon the first whorl the post-embryonic whorls being obliquely, regularly rib-striate. Aperture oblique, Achatinoid, the columella concave, truncate at the base, outer lip simple Internal axis slender, strongly sigmoid within each whorl. Soft anatomy unknown." (Pilsbry.)

"This group would hardly be thought distinct from Homorus, were it not well separated geographically from that African genus, at least in the recent fauna. Almost the sole distinguishing feature is the stronger sculpture of Bacillum. Both groups are merely large and solid forms of the Subulna type, so far as the shells are

concerned " (Pilsbry)

302 Bacillum daflaensis, Godwin-Austen

Glessula daflaensis, Godwin-Austen, J A. S B xiv, 1876, p 316, pl. 8, fig 10

Original description — "Shell elongately turreted, thick, obliquely striate, covered with a thick olive-green epidermis with a few dark streaks. Spire turreted, slightly convex in outline, apex blunt; whorls 11, rather flat, specimens with the apex preserved shewing erosion of the surface. Suture well marked. Aperture oblique, suboval, pale grey. Peristome acute, columellar margin slightly curved and but little thickened.

"Alt 19 [=48 mm], major diam 041 [=105 mm], alt.

ap 0 42 [=11 mm]" (Godwin-Austen)

Hab India Shengorh Peak, Dafia Hills (Godwin-Austen)
"This shell would appear to have a close connection with Gerosa, H Blf, from Darpling, but its much longer form

greater number of whorls, and the different colour of its epidermis (which is uniform throughout), at once distinguish it. As in G crosa, the position of the former apertures is distinctly indicated on the whorls " (Godwin-Austen)

This species appears to have been overlooked by Pilsbry when

monographing the genus in the Manual of Conchology

303. Bacillum erosum, Blanford.

Glessula erosa, Blauford, J.A.S.B. 1, 1871, p. 43, pl. 2, fig. 7, Nevill, Hand List, 1, 1878, p. 172, Pfeiffer & Clessiu, Nomencl Helic Viv. 1881, p. 331

Achatena (Electra) elose, Hauley & Theobald, Conch Ind 1874,

pl 78, fig 5

Achatina erosa, Pfeister, Mon Helic Viv viii, 1877, p 283
Bacillum erosum, Pilsbry, Man Conch ser 2, xviii, 1906, p 4, pl 1
figs 9-11.

Original description.—" Testa elongato-turrita, crassula, parum nitens, haud diaphana, longitudinaliter oblique striata, epidermide fusco-straminea induta. Spira turrita, lateribus convexiusculis; apice truncato. Anfractus apicales carentes; superstites 7 subplanati; superiores plerumque plus minusve decorticata et erosi; sutura impressa. Peristoma simplex, acutum. Columella leniter arcuata, ad basin oblique truncata.

"Alt. 35, diam. 10, aperturæ alt. 10, lat 5 mm
"Alt 36, diam 105, aperturæ alt 10, lat. 5 mm

"Alt 34, diam 9, aperture alt 9, lat 5 mm" (Blanford)

Hab Sikkim · Darjeeling (Atkinson d. Stoliczka)

"This species is easily distinguished from its local associate G. tenuispira, Bens, by its thickness and opacity, and by the character of the surface, which has none of the vitreous lustre so characteristic of the genus. The upper whorls are generally much eroded, the lower, which retain the epidermis, are of a dark straw colour with darker oblique bands at intervals, apparently marking stages of growth. Under a lens very fine dark spiral lines are also perceptible. I received several specimens of this shell in 1863 from Mi. W.S. Atkinson, but it has not hitherto been described. It appears to be a rare species. Dr. Stoliczka only got two specimens in forest at the waterfall about 1000 feet below Darjeeling." (Blanford.)

The only specimen I have seen is one presented by Dr Joseph Hooker to the British Museum, and probably collected by him during his famous travels in the Sikkim Himalayas. This shell is decollated, seven whorls remaining, and it measures: length

38 mm, diameter 12 mm

304. Bacillum theobaldi, Hanley.

Achaima (Electra) theobalds, Hanley MS, Hanley & Theobald, Corch Ind 1870, p 9, pl 17, fig 5

Achatma (Glessula) theobalds, Theobald, J A S B xxxx, 1871. p 395 (no description)

Achatma theobalds, Pterffer, Mon Helic Viv. vin, 1877, p 290

Stenogyra (Glessula) theohaldrana, Nevill, Hand List 1, 1878. v 172

Stenogyra (Subulma) theobalds, Pferffer & Clessin, Nomencl Helic Viv 1881, p 327

Bacillum theobaldi, Pilsbry, Man Conch ser 2, xviii, 1906, p 4, pl 1,

Original description —" Differs from A cassaca, of which it has been considered a variety, by its smoothness, more convex whorls, &c." (Hanley & Theobald)

Long 42. diam mai 11 mm (ea icon)

I have not seen specimens

305. Bacillum casiacum, Reeve

Achatina cassiaca (Benson), Reeve, Conch Icon v, 1849, Achatina, pl 17, fig 85, Pfeiffer, Mon Hehic Viv iii, 1853, p 499, ibid, Conch-Cab, Bulimus, 1856, p 310, pl 25, fig 1
Subulna cassiaca, Adams, Gen Rec Moll ii, 1855, p 110

Achatina (Subulina) cassiaca, Pfeiffer, Malak Blatt 11, 1856, p 169

Achatma (Bacillum) cassiaca, Theobald, Conch. Ind. 1870, p. 17. pl 36, fig 5

Achatina casiaca, Godwin-Austen, P Z S 1872, p 517, footnote Glessula castaca, Godwin-Austen, J A S B xliv, 1875, p 3, xlv, 1876, p 316

Stenogyra (Glessula) casaca, Nevill, Hand List, 1, 1878, p 172 Stenogyna (Subulina) cassiaca, Pfeiffer & Clessin, Nomenci Helic Viv 1881, p 327

Bacillum cassacum, Pilsbry, Man Conch ser 2, vvii, 1906, p 3, pl 1. figs 5-7

Original description .—" Shell elongately subulate, apex somewhat papillary, whorls fourteen to fifteen in number, flat, obliquely very closely and somewhat rudely sculptured with rib-like striæ, sutures impressed Columella arched, abruptly truncated, whitish, covered with a thin olive-brown epidermis The rib-like strike of this fine species, contributed by Mr Benson, have an oblique plicate growth" (Reeve)

Hab India Naga Hills (Roberts), Toruputu, Naga Hills and

Dafla Hills (Godwin-Austen) N. Cachar Hills (Pilsbry)

Reeve, when describing and figuring the species, attributed it to the Cassia [Khasi] Hills, but Lt -Col Godwin-Austen states (P Z S 1872, p 517, footnote) that he obtained it in the Naga Hills, never in the Khasi Later he again referred to it (J A S B alix, 1875, p 3) saying that he suspected Griffith's specimens were obtained in the Naga Hills and sent to Benson, who imagined they were from the Khasi Hills

OIR ACRATINIDA.

The Beddome collection contains four specimens, from the Naga-Hills which have the following dimensions:—

1°. Length 61 mm, dam 12 mm (14 whorls)

27 . 745 mm., 125 mm (14 whorls, rper broken).

5. . 71 mm. . 13 5 mm. (15 whork)

The first shows the remains of an epiphragm and contained a spherical calcurous egg 2.7 mm in diameter; two of the shells are provided with a thick callus on the parietal wall one forming a rused ridge.

There are besides in the British Museum, from the Khrsi Hills,

four specimens measuring 58 x 11 mm.

306 Bacillum muspratti, sp n.

Shell elongate-turrite, solid, dull, closely and irregularly striated, showing indistinct traces of spirals, covered with a decidious straw-



entire length of the shell. Aperture oblique, pyriform, peristome thickened, not reflexed or expanded, the margins united by a thick callus on the parietal wall; outer margin curving forward, basal margin shelitly arcuate, columella curved, only slightly truncate

Length 50, diam 12 mm, apert height 13, width 6 mm

Hab India Naga Halls, Assam (Beddome)

Type in the British Museum

Differs from B canacum in the smaller number of whorls, which increase more rapidly, in the absence of costa, and in the apical portion being more acuminate

A single unnimed specimen in the Beddome collection I also refer to this species. It is in a rather worn state, but the later whorls show a portion of the periostracum in fair condition

307. Bacillum obtusum, Blanford

Achalina (Glesenla) obtuea, Blanford, P Z S 1869, p 449 Achatina (Bucillum) obtava, Hanley, & Theobald, Conch Ind 1870, pi 10, fig 6

Achatina obtusu, Pfeiller, Mon Helic Viv vni, 1877, p 290
Glessula obtusu, Nivill, J. A. S. B. xlvi, 1877, p 25, ibid, in
Anderson, Zool Res. J. xp. W. Yunnan, 1, 1879, p 886
Stenogyra (Subulina) obtusa, Pfeiller & Clessin, Nomencl. Helic

ln 1881, p 327.

Bacillum obtunum, Pilebry, Man Conch ser 2, xviii, 1906, p 1, pl 1, hg 1

Original description -" Testa elongato-turrita, albulo-cornea, cerea, solidiuscula, confertim flexuose plicato-striata, infra suturam plicate Spira elongita, ad apicem subcilindracer, apice perobtuso papillari, sutura vix impressa subcorrugata Anfr 12-14, fere planulati, ultimus ad peripheriam subangulatus. Apertura obliqua, suborata, peristoma simplex, rectum

"Long 18-52, diam 10-11; ap long 10-11, lat. 5-5; mill.

apex 3 mill latus" (Blanford)

Hab Burma Bhamo (Anderson)

"Very close to A cassaca Bens, but distinguished by finer sculpture, narrower and less numerous whorls, and much more

obtuse apex" (Blanford)

On close examination B. obtusum looks quite distinct from castacum, owing to the spire being concave near the apex, this arises from the fact that the first and second whorls are a trifle wider than the third and fourth, and the apex consequently becomes very obtuse. The later whorls increase very slowly and regularly The base is also broader proportionately than in B castaca

The Theobald collection contains three specimens from the type locality measuring 51×11 mm

308 Bacillum orthoceras, Godwin-Austen

Glessula orthoceras, Godwin-Austen, J A S B xliv, 1875, p 2, pl 1, fig 4, op cit xlv, 1876, p 316

Achatma orthocei as, Hauley & Theobald, Conch Ind 1876, pl 159, for 6.

Stenogy, a (Glessulu) orthoceras, Nevill, Hand List, 1, 1878, p 172 Stenogyra (Subulma) orthoceras, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 327

Bacillum orthocer as, Pilsbry, Man Conch sei 2, xviii, 1906, p 2, pl 1, figs 2, 3, 12

Original description — "Shell very slender and elongate, pale grey or white, very finely and regularly ribbed throughout, very solid, apex blunt; whoils 13-14, slightly rounded, suture well impressed; aperture oblique, rounded below, outer hip sharply edged and continued as a well developed callus upon the strong thickened columellar margin

"Length 232 [59 mm], major diam 0.4 inch [10 mm]"

(Godwin-Austen)

Hab India W Khasi Hills, Nongumlai; Laudomodo (God-

win-Austen); Harmutti, Dafla Hills (Godwin-Austen)

"The species can at once be distinguished from G casiaca, Bens, by its white colour and by the absence of the dark blown epidermis that covers the latter, the whorls also are much more rounded, whereas in casiaca they are nearly flat" (Godwin-Austen)

In addition to the differentiating characters noted by Godwin-Austen, orthogen as has a narrower base and the costa are finer and

more crowded

Vai. austeni, Pilsbi y

Bacillum orthoceras austem (subsp.), Pilsbry, Man Conch ser 2, xviii, 1906, p. 3, pl. 1, fig. 4.

Original description—"Shell with the grey color, deficient cuticle and convex whorls of B. orthoceras, but much more rapidly tapering, the last whorl being much wider; striation coarser Spire straightly tapering, very slender above. The early whorls are broken from the type specimen, $9\frac{1}{2}$ remaining. Length (broken) 538, diam 12, length of aperture 125 mm. (Pilsbry) Hab India Naga Hills

Genus CURVELLA, Chaper

Hapalus, Albers, Die Heliceen, 1850, p 140 (section of Bulimus, only species B giateloupi, Pfeiser), von Maitens, Die Heliceen, ed 2, 1860, p 238 non Hapalus, Billberg, 1820 (Coleoptera)
Curvella, Chaper, Bull Soc Zool France, λ, 1885, p 49, Pilsbry, Man Conch ser 2, χνιιι, 1906, p 46

TYPE, C. sulcata, Chaper

Range. India, China, Philippine Islands, West, East, and South Africa.

"Conville regulièrement comque, mince, non ombiliquée, recouverte d'un epiderine très mince, luisant, olivâtre : de cinq a six tours de sure, peu globuleux, ornes de stries ou cotes d'accroissement, columelle drone on courbe, ouverture à bords tranchants. bord columellare legérement étale en arrière, bord externe fortement arque en avant dans sa partie movenne, se recourbant brusquement en sens contrine vers sa base de façon que la suture en soit fortement reportee en arrière" (Chaper)

"This genus is separated from Opeas by the forwardly arched outer lip, the shorter, wider contour, and usually smaller number of whorls. The columella is frequently singous. In some cases the separation from Opens seems somewhat arbitrary, and the boundaries of the two groups in detail are still unsettled. The species were considered Bulimi in the older classifications, but

there is no doubt that they are Achatinoid

"Central tooth of the radula narrow, laterals tricuspid duction is by globular eggs, small and calcareous-shelled, as in the closely related group Opens." (Pilsbry)

309 Curvella sikkimensis. Reeve

Bulimus sill imensis, Reeve, Conch. Icon. v, 1850, Bulimus, pl. 87, fig. 651 (juv.), Pfeiffer, Mon. Helic. Viv. 11, 1853, p. 436. ibid, Conch-Cab, Bulanus, 1853, p 78, pl 21, figs 10, 11, Benson, A M N. II ser 3, v, 1860, p 464, Hanley & Theobald, Conch Ind 1870, pl 19, fig 7

Bulenus (Ithnehis) sikkimeneis, Pieisser, Malak Blatt ii, 1856,

p IGI

Hapalus ed I emerica, Nevill, Hand List, 1, 1878, p. 174

Stenogyra (Spiraris (Nothus)) siklumensis, Piciffer & Clessin, Nomencl Helic Viv 1851, p 324 Currella sill imensis, Pilsbry, Man Conch ser 2, viii, 1906, p 66

pl 9, figs 59, 60

Original description -" Shell orate, somewhat inflated, spire rather short, obtuse at the apex, whorls four in number, the last much the largest, concentrically finely striated, sutures impressed, columella slightly twisted, thinly reflected, aperture oblong, slightly sinuated at the upper part, pale olive, semitransparent" (Reeve)

Hab India Darjeeling, Sikhim (Benson, Blanford, Stoliczka,

Mannaring)

"The shell figured in 'Conchologia Iconica' as Bulimus sikkimensis, Reeve, proves to be an extremely young specimen of a fine Spiraxis, of which an example with seven whorls, was obtained at Darjeeling by Mr W T Blanford, measuring 27 mill in length by nearly 10 in diameter.' (Benson)

Four specimens in the British Museum measure only 17 mm in length, with a diameter of 65 mm, but these are probably

immature.

310 Curvella blanfordi, sp n

Shell elongate-conoid, rather solid, finely and closely striated, dull, greenish coincous. Spire narrow conoid, with straight sides, suture shallow, apex acute. Whorls 7½, flattened, increasing rapidly, the last equalling 2 the entire length of the shell. Aperture elliptic-reinform, peristome thin, the margins united by a thin callus on the parietal wall, outer margin nearly vertical and straight, basal margin curved, columellar margin reflexed, much twisted.

Length 275, diam 10 mm,, apert height 11, width 4 mm.



Fig 119 - Cur cella blanfords 3

Hab India Darjeeling, Sikkim (W T Blanford) Type in the British Museum.

A specimen in the British Museum, presented by the late W. T. Blanford in 1860, was labelled Bulimus sikkimensis, but differs from that species in the sinuous columella, the flattened whorls, and the covered umbilicus, it is besides a larger shell. It may be separated also from Curvella munipurensis by the more flattened whorls and the more twisted columella.

311 Curvella scrobiculatus, Blanford

Bulimus sciobiculatus, Blanford, J. A.S. B. xxxx, 1865, p. 77, Pfeisler, Mon. Helic. Viz. vi, 1868, p. 151, Hanley & Theobald, Conch. Ind. 1874, pl. 79, fig. 9.
Bulimum (Hapalus) sciobiculata, Pfeisler & Cless a, Nomencl. Helic. Viz. 1881, p. 300.

Hapalus scrobiculatus, Nevill, Hand List, 1, 1878, p 175

Original description — "Shell subobtectly perforated, turntedly ovate, thin, horn, vellowish white, marked with vertical, subarcuate, rather irregular, closely set, raised lines. Spire turnted, apex obtuse, suture simple, impressed. Whorls 6, convex, the

last rounded beneath Aperture vertical, truncately ovate, perstome simple, thin; right margin considerably curved forwards; columellar vertical, curving to the left near the base, frequently straight, rather broadly reflexed

"Length 7, diam 31 mill, length of apert 31 mill."

(Blanford)

Hab. Burma. Pegu, west of the Irawaldy (Blanford)

"The nearest ally of this species is its congener B putus, Bens, which inhabits the same localities, and differs in its greater turnidity and less marked sculpture. There is, however, much variation in the first named character, and despite the great difference between the two forms in general, there is some appearance of a passage. Two specimens of B putus which I possess, measuring respectively 7 and 81 millem in length, are both 5 millem in diameter. Both these shew a tendency to a passage to Spiraxis?" (Blanford.)

I have seen two specimens in the British Museum which measure 6 mm in length with a diameter of 35 mm, but they

are probably immature

312. Curvella pusilla, Blanford.

Spiraris pusilla, Blanford, J. A. S. B. xxxiv, 1865, p. 78, Pfeiffer, Mon. Helic Viv. vi, 1868, p. 102, Hauley & Theobald, Conch. Ind. 1874, pl. 79, for 8

Ind. 1874, pl. 79, fig 8

Mapalus pusilius, Nevill, Hand List. 1, 1878, p 174

Stenogyra (Spiraxis (Euspiraxis)) pusilla, Pfeisser & Clessin, Nomencl. Helic. V.v 1881, p 324

Cur rella pusilla, Pilsbry, Man Conch. ser 2, xviii, 1906, p 64, pl 9, fig 48

Original description — "Shell imperforate, orate, thin, horny, yellowish white, costulately striated. Spire conically pyramidal; sides straight, apex rather acute; suture impressed. Whorls 5, convex; the last longer than the spire (ratio=4.3) and rounded beneath. Aperture rather oblique, subpyriform; peristome simple, acute, much curved forwards on the right margin; columella scarcely twisted, reflexed, appressed on the whorl

"Length 6, diam 31, length of aperture 31 mill" (Blanford)

Hab Burma: Prome, Pegu (Blanford)

"I am not quite sure if all of the few specimens I possess of this peculiar small form came from Akoutoung, or whether some may not be from Thayet Myo. The shell resembles voung specimens of Bulinius puties, Bens, so closely, that it can only be distinguished by the absence of any perforation" (Blanford)

313 Curvella puta, Benson

Bulimus putus, Benson, A. M. N. H. ser. 2, xix, 1857, p. 330; Pfeiffer, Mon. Helic. Viv. 1v, 1859, p. 502, Blanford, J. A. S. B. xxxiv, 1865, p. 94, Hanley & Theobald, Conch. Ind. 1874, pl. 80, fig. 9

Hapalus putus, Nevill, Hand List, 1, 1878, p 175

Bulimina (Hapalus) puta, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 299

Buliminus (*) putus, Kobelt, Conch-Cab, Fam Buliminidae, 1901, p 689, pl 103, fig 23

Original description - "Testa perforata, ovato-acuta, tenui, striatula, sub epidermide tenui cornea albida, spira conica, apice obtusiusculo, sutura satis impressa; anfiactibus 6 convexis. ultimo dimidium testæ vix superante, apertuia verticali, semiovali majuscula, peristomate acuto, recto, margine columellari reflexiusculo

"Long 7, diam vix 5 mill., long apert vix 4, diam. 21 mill" (Benson)

Hab Burma Tavoy (Theobald), Akoutoung, Thyet Myo, and Bassein District (Blanford)

314 Curvella plicifera, Blanford.

Bulimus photfer, Blanford, J A S B xxxiv, 1865, p 77, Pfeiffer. Mon Helic Viv vi, 1868, p. 151, Hanley & Theobald, Conch. Ind 1874, pl 80, fig 8

Bulimina (Hapalus) plicifera, Pfeiffer & Clessin, Nomencl, Helic

Viv 1881, p 300

Buliminus (5 n s) pheifer, Kobelt, Conch -Cab, Fam Buliminidae, 1901, p 688, pl 103, fig 22
Curvella pheifera Pilsbry, Man Conch ser 2, xviii, 1906, p 63,

pl 9, fig 45

Original description.—"Shell obtectly perforated, ovately conical, rather thin, horny, finely striated Spire conical, apex obtuse; suture marginate, scarcely impressed. Whorls 5, planulately convex above, the last longer than the spire, somewhat tumid, rounded at the base Aperture vertical, truncately oval, subpyritorin, peristome simple, right margin curved forwards; columellar callous, subvertical, slightly curved, rather broadly reflexed, margins united by a callus bearing a small entering lamella about the centre

"Length 9, diam $5\frac{1}{2}$ mill, apert 5 mill high, $2\frac{1}{2}$ broad"

(Blanford.)

Hab Burma. Thyet Myo, Pegu (Blanford), Prome (Theobald) "A more turnd shell than B putus, Bens, and easily distinguished from all other Indian and Burmese forms of the genus by the re-entering parietal plant" (Blanford)

Pilsbry places it in Curvella with some doubt, stating that its

systematic position is uncertain

315. Curvella munipurensis, Godwin-Austen

Bulimus (Harpalus) munipus ensis, Godwin-Austen, P Z S 1872, p. 516, pl 30, fig 8

Bulimus (Hapalus) mumpurensis, Hanley & Theobald, Conch. Ind

1876, pl 148, figs 1, 4

353

Bulimes mamma case, Pfeiffer, Mon Helic Viv. viii, 1877. n 192

Hana'us memma cuus, Nevill, Hand List, 1, 1878, p. 174

Bulimina (Hapelus) mimparensis, Pfeisser & Clessin, Nomencl.

Helic Viv 1881, p 200

Currella runnmurersis, Pilshry, Man Conch ser 2, xvin, 1906, p 65, pl 0, figs. 51, 52

Original description -"Shell rimite, clongately turreted, thin, covered with a pric other or striw-coloured epidermis, and strongly and obliquely striated, spire turreted, apex blunt, whorls 71, convex, suture strongly impressed, aperture oblique. rounded below, milky white inside; peristome acute, outer and upper margin arched well forward, columellar margin straight, strong, and slightly twisted forward: a thin white callus on the parietal margin. Anin al pale orange, fainter tint above the head: fout short; eye-peduncles short, swollen at the base, lower tentacks very short blunt projections

"Alt 0 SS mch [=22 25 mm], diam 0 30 [=75 mm]; apert alt 0 35 [=9 mm], lat 0 17 [=4 25 mm]" (Godwin-Austen)

Hab Judia - Hengdon Peak, 7000 ft. On the Munipur

boundars (Godu in-Austen)

This species is intermediate between C. silkimensis and C Thusiana, but it has the list whorl proportionately much wider than the latter, nearly equalling half of the entire length of the The shell is firmly plicate-striate and decussated specimens in the British Museum measure 16 × 65 mm

316 Curvella khasiana, Goduin-Austen

Buliums (Harpalus) Thanams, Godwin-Austen, P Z S 1872.

p 516, pl 36, fig 7

Bulimus (Harpalus) Lhanacus, Godwin-Austen, J. A. S. B. xlv.

Bulimus (Hapalus) khasinnus, Hurley & Theobald, Conch Ind 1670, pt 148, hg 7

Bulamus I hasianus, Pfeiffer, Mon Helie Vis vin, 1877, p. 183 Hapalus khasianus, Nevill, Hand List, 1, 1878, p. 171

Bulimina (Hapalus) Phasiana, Pfeisser & Clessin, Komenel Helie Viv 1881, p 200

Currella I hanana, Pilsbry, Man. Conch. ser 2, xviii, 1906, p. 65. pl 9, figs 53-55, 58

Original description - "Shell subperforate, ovately turreted or acutely ovate, thin, disphanous, fresh specimens often glossy. becoming dull white or pale straw-colour with age; minutely stricted under lens, spire conical, apex blunt, suture moderate. whorls 6-7, slightly convex, the body-whorl large and tumid aperture vertical, semi-oval; peristome simple, sharp, rounded and arched considerably forward at the upper angle; the columella is curved forward from behind, and the margin slightly reflected.

"Alt 059 mch [=1475 mm], diam 028 [=7 mm], apert diam 0 16 [=4 mm], alt 0 29 [=7 25 mm.] Large sp

"Alt 0 41 inch [=10 5 mm.], diam 0 20 [=5 mm], apert.

diam 0.12 = 3 mm, alt 0.23 = 6 mm.

"Animal with a short foot, pointed behind, pale yellow tint, eye-tentacles dark to the base, lower very short" (Godwin-Austen)

Hab. India Khasi, Jaintia, and Naga Hills (Godwin-Austen); Dikrang Valley, Dafia Hills, 2500 ft (Godwin-Austen); Naga

Hills (Roberts); Darreeling, Sikkim (Stoliczka)

"It appears to be very close to Bul. putus, Bens, from Tavoy. Specimens differ very much in size from different collections. The shell is very finely developed in the high parts of the North Cachai Hills at 6000-7000 feet (fig 7). At Cherra Poonjee it assumes a more turnid form (fig 7u), and it is very frequently dwarfed to the length of only 0.36 inch [=9 mm], especially in its lower habitats; but these variations are not of sufficient specific importance." (Godwin-Austen)

Jousseaume expressed the opinion* that *O. khasianus* and *C munipurensis* are identical in form. A glance at the figures will convince anyone that this suggestion is not borne out by

facts.

The British Museum possesses four specimens from the Khasi Hills, measuring 12×5.5 mm.

Genus OPEAS, Albers

Opeas, Albers, Die Heliceen, 1850, p°175 (as subgenus of Bulimus), first species Bulimus subula, Pfeisfer, Martens, Die Heliceen, ed 2, 1860, p 265 (as subgenus of Stenggya), type Helic goodalu, Miller, Crosse & Fischer, Miss Scient Mexique, Moll 1, 1877, p 592; Pilsbry, Man Conch ser 2, xviii, 1906, p 122

Tipe, Bulimus subula, Pfeiffer.

Range Throughout tropical and subtropical regions, except Australia

"Shell small, thin, turrite, usually perforate, with large, obtuse, rounded apex and convex or flattened whorls, corneous or yellowish Embryonic whorls smooth Aperture small, ovate, the outer lip thin, usually arched forward, columella straight or concave, not sinuous, the columellar lip reflexed, curving into the basal lip and not toothed or truncate below Oviparous, the egg-capsules large and spheroidal

"Opeas contains small, thin, oviparous stenogyrine snails with the apex large, obtuse, rounded and smooth, and the columellar margin reflexed, rounded below, or at least not distinctly truncate. The species are spread throughout tropical and subtropical regions, but as yet none is known from Australia. A few species colonize freely, and have spread wherever commerce reaches in suitable climates. Others, restricted to special stations not to be

^{*} Bull Soc. Zool France, x, 1885, p xx11

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found in cultivated areas, are as local as most other land smalls. Owing to the similarity of the shells, their determination is

difficult, and demands the greatest application

"Opeas stands very close to the groups Prosopeas and Cantella The former differs by merely such minor features as the rougher, often minutely lamellose sculpture, the greater size and flatter whorls, but these give the shell a rather different aspect Curvella in its typical form differs by the short and Bulimoid shape, but some of the species are arbitrarily referred to one or the other genus. The distinction between Opeas and Curvella is by no means convincing; yet even small differences have significance which may usefully be recognized in dealing with large groups of similar species.

"Opens and Subulina begin to reproduce before the shell has attained its full size, usually when it is about two-thirds

rou n

"In many species two forms co-exist in the same colony, a more slender and a stouter, all other features remaining the same. Intermediate contours usually occur if a large gathering is at hand. This dimorphism must be kept in mind, especially when dealing with small sets.

"Excepting a few forms spread by commerce or other means, the Old and New World species are istinct. Most of the

Eastern forms belong to typical Opeas

"Several species in each hemisphere have been enabled, by their hardiness and adaptability to life in cultivated areas, to colonize over a large part of the tropical and subtropical zones. There cannot be much doubt that the carriage of living plants from place to place has been a chief factor in the dispersal of Opeas—and other smalls as well. The habits of these forms are such that they find practically the same environment anywhere in zones of similar temperature, and their spread from new centres is often, very rapid. Opeas quartle is probably the most widely distributed land small in the world." (Pilsbry)

I have quoted at some length from the admirable account of this difficult genus by Professor Pilsbry, which sets forth all the known facts in an extremely lucid fashion. His observations with regard to dimorphism—to which he is, I believe, the first to draw attention—are particularly valuable, and should be borne in mind by every conchologist when about to describe supposed new

species

317. Opeas gracile, Hulton.

No 5, Bulimus?, Hutton, J A S B III, 1834, p 84, No 5, Bulimus? (mihi) graculus?, ibid. tom cit p 93, Pfeisfer, Mon Helic Viv. 11, 1848, p 157, Reeve, Conch Icon v, 1849, Bulimus, pl 69, fig 495, Blanford, J A S B xxxiv, 1865, p 94, Pfeisfer, Conch-Cab, Bulimus, 1853, p 79, pl 21, figs 18, 19, Hanley & Theobald, Conch Ind 1870 pl, 23, fig 4, Godwin-Austen, J A S B xiv, 1876, p 317

 2×2

Buhmus (Opeas) gracilis, Pfeister, Malak Blatt 11, 1856, p 156
Stenogua (Opeas) gracilis, von Martens, Die Heliceen, ed 2, 1860,
p 265, Nevill, J A S B alvi, 1877, p 25, ibid, Hand List, 1,
1878, p 164, ibid, Zool Res Exp W Yunnan, 1, 1879, p 885,
Pfeister & Clessin, Nomencl Helic Viv 1881, p 321
Spiraris gracilis, Blanford, J A S B axa, 1861, p 362
Stenogyia gracilis, von Martens, Preuss Exp Ost-Asien, Zool
Theil, 11, 1867, p 375, pl 19. hg 5, pl 22, hg 13, Westerlund,
Vega Exp Vetensk Jakt iv 1887, p 187, Peile, Journ
Bombay Nat Hist Soc xi, 1908, p 131
Opeas gracilis, Theobald, J A S B alvii, 1878, p 146. GodwinAusten, P Z S 1895, p 443, Collett, J A S Ceylon, av, 1898,
p 17, Smith, Fauna and Geogr Maldive & Laccadive Aich 1,
part 2, 1902, p 141
Opeas gracile, Mollendorff, P Z S 1894, p 151, Pilsbry, Man
Conch ser 2, aviii, 1906, p 125, pl 18, hgs 3-6
Bulimus indicus, Pfeister, P Z S 1846, p 40, ibid, Mon Helic
Viv 11, 1848, p 157
Opeas indicus, Dautzenberg & Fischer, Journ Conchyl lin, 1905,
p 102
Opeas apea, Mousson, var micobarica, Morch, Journ Conchyl 1872,
p 313

Original description — "Shell transparent, thin and pale coloured or rather colourless, spire gradually tapering, who is 12, body-whorl equal to the two preceding ones, length 6½ lines * Aperture longer than broad, semi-ovate; pillar-lip straight and

slightly reflected; right lip edged " (Hutton)

Hab India Mirzapoie (Hutton), Calcutta, Raymehal, Chandipal, Patna (Nevill, Mainwaimg), Erode, Poona. Bombay (Blanford, Fairbank), Bombay Island (Pele), Assam (Stoliczka), Khasi Hills (Adams); Dafia Hills (Godwin-Austen), Madris (Blanford); Kashmir (Theobuld), Naini Tal, Salt Bange, Rooikee (Stoliczka) Burma Zwagabin, Aiakan, Rangoon, Moulmain (Stoliczka, Theobald), Tsagain, Bhamo (Anderson), Ava, Pegu, Arakan, Moulmain (Blanford) Ceylon Point de Galle (Maitens, Vega Erped); Ambagamuwa (Collett). Ancaman Group (Stoliczka, Nevill), Port Blair (Godwin-Austen) Nicobar Group Telessa (Godwin-Austen) Nancoury (Morch) Laccadive Islands (Stanley Gardine) Samui Islands (Mollendorff)

In addition to the foregoing localities within the Indian region, the species has been recorded from China, Formosa, and Japan, the Malay Archipelago, the Mascarenes, and Polynesia The bibliography here quoted is limited to its bearing on the Indian Fauna, and I have omitted all references to its occurrence outside the Indian region The bibliography, including varieties, contained in the Manual of Conchology, comprises upwards of two whole pages Pilsbry includes O subula, Pfeisfer, under its synonymy, but the identity of the two forms I do not consider has been established, and I prefer to confine the designation of O gracile

^{*} I have only one of this length, the generality being about 5 lines — It has also 12 whorls, while the others have about 9 or 10

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to the Old World form, retaining O subula for the American shells

The British Museum possesses specimens received from Hutton who collected them at Muzapore, these measure 135×35 mm My own collection contains specimens composed of nine whorls and measuring 13 mm in length. One of these contained four spherical calcareous eggs 0 75 in diameter Major Peile has collected the species at Bassem and Bombay Island, some of the latter having the periostracum in a beautiful fresh state, a rather rare occurrence

Var. panavensis. Pfeiffer.

Bulimus panayensis, Pfeisler, P Z S 1846, p 33, ibid, Mon-Helic Viv 11, 1848, p 156

Stenogyra panayensis, von Maitens, Preuss Exp Ost-Asien, Zool. Theil, n, 1867, pp 83, 376, pl 22, fig 8, Tapparone Canefri, Ann Mus Cu Genova, xiv, 1883, p 87, ib, xv, 1884, p 144; Semper, Reisen Arch Philipp 2te Teil, in, 1885, p 137, pl. 8, fig 15 (shell), pl 11, fig 17 (anat.), fig 21 (dentition), Westerlund, Vega Exped Vetensk Jakt iv, 1887, p 187, Hidalgo, Journ Conchyl xxxvi, 1888, p 34, Fischer & Dautzenberg, Mission Pavie, in, 1904, p 411

Stenogyra (Opeas) panayensis, Pfeiffer & Clessin, Nomencl Helic. Viv 1881, p 321, von Martens in Max Weber, Zool Ergebn

Reise Niederl Ost-Indien, ii, 1891, p 243

Opeas gracile, var. panayensis, Pilsbry, Man Conch ser 2, viii, 1906, p 131, pl 18, figs 1, 2

Original description -"Bul testa imperforata, subulata, tenui, lavigata, pellucida, cereo-hyalina, spira elongata, apice obtuso, anfractibus 8, latis, vix convexiusculis, ultimo i longitudinis vix æquante, columella brevi, strictiuscula, apertura ovali-oblonga, basi subangulata, peristomate simplice, recto, margine columellari breviter reflexo, appresso

"Long 11, diam 21 mill" (Pfeiffer)

Hab Ceylon Point de Galle (Westerlund)

Said to have a general distribution from Indo-China to the Moluccas and Aru Islands Collected in Ceylon by the Vega Expedition

Var cereus, Reeve

Bulimus cereus, Reeve, Conch Icon v, Bulimus, 1849, sp 501, Achatina, pl 17, fig 81

Bulimus macilis, var ? cereus, Pleister, Mon Helic Viv 1853,

Stenogy a (Opeas) gracilis, var čerens, Pferfier & Clessin, Nomenci Helic Viv 1881, p 321

Opeas gracile, var cereus, Pilsbry, Man Conch ser 2, vvii, 1906, pp 127, 128, pl 18, hg 7

Original description —"Shell subulate, umbilicated, thin, whorls

ten in number, convex, arcuately concentrically striated, columella reflected, aperture small, lip simple, transparent straw-colour

"Whorls appear more convex than in B gracilis" (Reeve)
Hab India Moradabad

318. Opeas prestoni. Sulces

Opeas prestoni, Sykes, Proc Malac Soc London, 111, 1898, p 73 pl 5, fig 4

Opeas mauritanum, var prestoni, Pilsbry, Man Conch ser 2.

Aviii, 1906, p. 134, pl. 17, figs 98-100

Original description — "T subperforata, elongato-cylindrica, translucida, tenuis, cornea vel cereo-cornea, apice obtusiusculo, anfr $8\frac{1}{2}$, plano-convexi, longitudinaliter lineis incrementibus striati, ultimus $\frac{9}{20}$ longitudinia subæquans, sutura bene impressa, apertura elongato-ovata; peristoma simplex, acutum, margine columellari ad basim breviter reflexo, perforationem fere tegente

"Alt 11, diam 3 25 mm, alt ap 3, lat ap 18 mm" (Syles)

Hab Ceylon Uda Pussellawa (Preston)

"The apex is much more obtuse and the earlier whorls are broader than O. gracilis, and the shell generally is more cylindrical and not so needle-shaped; it appears to be variable in colour I have given the dimensions of an average specimen; one found by Mr Preston measures alt. 14, diam 4 mm ' (Sykes)

319 Opeas innocens, Preston.

Opeas unnocens, Preston, Rec Indian Mus v, 1910, p 33, fig. 2

Original description —"Shell bluntly subulate, whitish, thin, whorls 8, flat, rather sharply shouldered above and below, transversely structe with lines of growth; sutures deeply impressed, columella descending in a slight curve, extending above into a thick, parietal callus which joins the margin of the lip above; labrum acute, simple, aperture elongately ovate

"Altıtude 5 5, diam major 1.25, apert alt 75, diam 25 mm"

(Preston)

Hab. Burma. Khayon Cave, near Moulmann (Annandale)
Appears to be closely related to, if not identical with, O gracile

320. Opeas latebricola, Reeve

Bulimus latebricola (Benson), Reeve, Conch Icon v, 1849, Bulimus, pl 80, fig 572, Pfeiffer, Mon Helic Viv 111, 1853, p 401 1bid, Conch -Cab, Bulimus, 1853, p 74, pl 20, figs 5,6, Hanley & Theobald, Conch Ind 1874, pl 79, fig 7
Bulimus (Opeas) latebricola Pfeiffer, Malak Blatt 11, 1856, p 156.

Bulimus (Opeas) latebricola Pferfler, Malak. Blatt 11, 1856, p 156. Stenogyra (*) latebricola, Nevill, Hand List, 1, 1878, p 174
Bulimina (Hapalus) latebricola, Pferfler & Clessin, Nomencl Helic

Viv 1881, p 299

Opeas latebricola, Pilsbry, Man Conch ser 2, aviii, 1906, p 162,

pl 19, figs 20, 23

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Original description.—"Shell acuminately oblong, compressly umbilicated, whorls six in number, somewhat rounded, smooth, or concentrically striated, transparent straw-colour, polished A very delicately coloured, transparent species" (Reeve)

Hab India Landour, Western Himalayas (Benson), Darjeeling (Blanford, Stoliczka, Marnwaring), Khasi and Dafla Hills (Godwin-

Austen).

The above cursory description is supplemented by Pfeiffer as

follows:---

"T. subperforata, turnto-oblonga, tenuicula, striatula, vix nitidula, diaphana, albido-straminea, spira turnta, apice obtusius-cula, anfr. 6-6½ vix convexi, ultimus § longitudinis paulo superans, basi rotundatus, columella substricta, verticalis, oblonga, perist simplex, rectum, marginibus subparallelis, columellari anguste reflexo

"Long 71, diam 3 mill Ap 22 mill longa, 12 lata"

(Pferffer)

The British Museum possesses five specimens from Landour, received from the Indian Museum, which are smooth and polished, and very finely striated, while the columella has a slight, revolving plait, to which neither Reeve nor Pfeiffer makes any reference. These specimens only measure 55 mm in length, whereas the shell figured by Reeve has an indicated length of 7 mm. Prof. Pilsbry considers the species related to O layard, but the latter has the outer margin of the peristome inflected, a feature lacking in O. latebricola.

321. Opeas mariæ, Jousseaume.

Opeas mariæ, Jousseaume, Mém Soc Zool. France, vii, 1894, p 290, pl 4 fig 9, Pilsbry, Man Conch ser 2, xvii, 1906, p 150, pl 4, fig 9

Original description — "Testa subperforata, elongato-turrita, solidula, opaca, arcuatim striata, alba, epiteste flavido-alba, vix nitens, spira elongata, apice obtusa, sutura immersa, crenulata, anfr 8, convexiusculi, ultimus 4 longitudinem æquans, apertura oblongo-ovalis, superne oblique truncata, perist simplex acutum, margine dextro superne depresso, fere recto, columellari ad suturam late dilatato-reflexo, perforationis partem formante.

"Long 9 mill., diam 2 mill ' (Jousseaume)

Hab Ceylon Kandy (Simon)

Mr Sykes suggests (Proc Malac Soc London, 11, 1898, p 73) that it is "suspiciously near" to O gracile, but Jousseaume's figures do not bear out this contention, as the whorls are much more flattened and proportionately higher, while the outer hip of the peristoine is considerably more straightened.

322 Opeas nevilli. Godwn-Austen

Oneus neville. Godwin-Austen, J. A S B xlv, 1876, p 315, pl 8. Stenogura (Opeas) neville, "G Ad", Nevill, Hand List, 1, 1878. p 165

Original description - "Shell turreted, very elongate, pale, silky with a green tinge, older specimens of a pale straw-colour. covered with a thin epidermis, beautifully striate under lens. Whorls 11-12, moderately rounded and very gradually diminishing in size to the apex, which is blunt, suture impressed; aperture angular above, outer lip thin.

"Alt 055" [=14 mm], major diam 010" [=25 mm]. Largest specimen 090" [=23 mm.]" (Godwin-Austen)

Hab. India: Dafia Hills, Assam (Godwin-Austen)

"This very delicate elongate shell was common on Toruputu Peak, but far finer specimens, equal in size to the figure, were obtained on the banks of the Pichola Nulla out in the plains. I am not satisfied with this figure, the whorls being rather too

flat and the apex too sharp" (Godwin-Austen)
Prof Pilsbry (Man Couch. ser 2, xviii, 1906, p 157) states,
'Nevill in his Hand List Ind Mus. 1, p 165, lists Stenogyra (Opeas) neville, G Ad, from the Daffa Hills It is undescribed and unknown to me" The "G. Ad" in Nevill's Hand List is evidently a printer s error for "G-A" and this probably put Pilsbry off the track

323 Opeas layardı, Benson

Spir axis layardi, Benson, A. M. N. H. ser 3, xi, 1863, p. 90, Pfeiffer, Mon Helic Viv vi, 1808, p 190, Hanley & Theobald, Conch. Ind 1874, pl 79, figs, 2, 3

Stenogy a (2) layar dr, Nevill, Hand List, 1, 1878, p 174

Stenogy a (Spiraris (Euspiraris)) layardi, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 323

Euspiravis layardi, Jousseaume, Mém Soc Zool France, vii, 1894,

Opeas layards, Pilsbry, Man Conch ser 2, xviii, 1906, p 158, pl 4, figs 19, 20, pl 16, figs 82, 83

Opeas (Tomopeas) layardı, Pılsbry, 1 c p 123

Original description - "S testa imperforata, elongato-turrita, tenui, arcuato-striatula, albida, epidermide tenui polita cornea ınduta, spira elongata, apice obtuso, sutura profundiuscula, nonnunquam eroso-dentata, anfractibus 7½, convexis, ultimo pone columellam impresso, apertura oblonga, elongato-ovata, superne angustata; peristomate tenui, acuto, labro arcuato, margine columellari incrassato, modice torto

"Long 121, diam 4 mill, ap long 4, diam vix 2 mill"

(Benson)

Hab Ceylon Moopana, Badulla, Kandookare (Layard), Caltura (Nevill)

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The species is referred to Opeas by Pilsbry with some doubt, who considers that "the subtruncate, calloused columella recalls Tortaris, yet the delicacy of the shell, its small apex, and the origanous reproduction, are characters of Opeas It is probably related to O avenacea, Morel, javanicum, Rie, etc, which have the columella similarly truncate'

I have only seen one specimen, which is in the British Museum It is from Kandy and measures length 165 mm. diam.

4 25 mm

324 Opeas sykesi, Pilsbry.

Opeas syless, Pilsbry, Man Conch ser 2, xviii, 1906, p 157, pl 21, figs 1, 2

Original description — "Shell perforate, resembling O gracile in sculpture, but with the whorls much shorter, more compactly coiled, more numerous in shells of the same length. Spire straightly and regularly tapering to the small apex. Whorls \$\frac{1}{2}\$ to 10, the embryonic \$\frac{1}{2}\$ smooth except for a minute subsutural radial striation, which becoming stronger on the post-embryonic whorls, produce a fine, irregularly developed crenulation of the suture, the latter becoming smooth again lower down. Later whorls somewhat flattened. Suture well impressed. Aperture vertical, much shorter than in O gracile; outer lip weakly arcuate, a little arched forward, basal margin well arched, columella rather straightened, the edge reflexed.

"Length 11, diam 34 aperture 29 mm.; whorls 82

"Length 129, diam 35, aperture 31; whorls 10" (Pilsbi y)

Hab Ceylon

"This form is readily selected from among O gracile by its short whorls and small, wider mouth, with a deep bay where the columella joins the parietal wall. I do not see, in the great number of O gracile before me, any approach to this form" (Pilsbry)

325 Opeas? pusillus, H Adame

Bulemulus (Ena) pusillus, H Adams, P Z S 1867, p 307, pl 19,

fig 17

Stenogyra pusilus, Nevill, Enum Helic. Ceylon, 1871, p 3
Bulinius (Bulimulus) pusillus, Pfeiffer, Mon Helic Viv viii, 1877,

Bulimulus (Leptomerus) pusillus, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 234

Ena pusilla, Jousseaume, Mém Soc. Zool France, vii, 1894 p 297

Original description — B testa sinistrorsa, rimato-perforata, cylindrico-turrita, tenui, inæqualiter striata, vix intidula, olivaceo-fusca, spira elongiti, sursum parum attenuata, apice obtusiuscula, sutura distincta, anfr 7, convexiusculis ultimo d longitudinis vix

æquante, bası rotundato; apertura verticali, semiovali, perist recto. margine columellari subverticali, superne dilatato, patente "Long 5, diam 2 mill" (H Adams) Hab Ceylon, Matelle (F. Lauard)



Fig 120 - Opeas ? pusillus (Enlarged) (From P Z S)

"Peculiar from being, at least so far as I know, the only sinistral land-shell that has yet been met with in the island" (H. Adams.) Referred with some doubt to Opeas, it certainly has nothing to do with Ena It may possibly be a monstrosity. I give a copy of Adams's figure.

Genus PROSOPEAS, Morch.

Prosopeas, Morch, Journ Conchyl 1876, p 358, as section of Bulimus for B roepstor fi, Morch, and B achates, Morch (no description), Pilsbry, Man Conch. sei 2, Aviii, 1906, p 14

TYPE, Bulimus roepstorffi, Morch.

Range Farther India, including Malay Peninsula, Andaman and Nicobai Islands, China, Malay Archipelago, Philippine Islands

"Shell Stenogyroid, of moderate or large size, imperforate or nearly so, with rather small, semiglobose apex, the first two whorls typically smooth (but ribbed in the s g Paropeas), later whorls very densely sculptured with fine oblique strice which are arched for ward above and retracted to the suture Aperture ovate, columella straight or concave, continuous with the basal margin below, slightly or not folded above, with a reflexed, adnate margin Axis slender, straight or nearly so Reproduction by globular, calcareous-shelled eggs, as in Opeas

326 Prosopeas hebes, Blanford.

Spuars hebes, Blanford, J A S B xxx, 1861, p 361, pl 1, fig 15, Pferiffer, Mon Helic Viv vi, 1868, p 190, Hanley & Theobald, Conch Ind 1874, pl 79, fig 10.

Stenogyn a (Opeas) hebes, Nevill, Hand List, 1, 1878, p 166

Stenogyn a (Spragger / France 1998) Library & Clessin, Nomencl

Stenogyn a (Spn aars (Euspn ans)) hebes, Pfeiffer & Clessin, Nomencl

Helić Viv 1881, p 323 Prosopeas hebes, Pilabry, Man Conch sei 2, xviii, 1906, p 32, pl 12, fig 6

Original description -"Testa imperforata, turrita, cornea, rugoso-

striata, spira subulata, apice perobtusa, sutura albido-marginata Anfr 7 parum convexi, ultimus 3 longitudinis subæquans, basi rotundatus Columella parum callosa, vix subtorta, brevis Apertura fere verticalis, elongato ovalis; peristoma simplex, rectum, margine dextro superne arcuato

"Long 15, diam. 4 mm., ap 41 alta, 2 lata" (Blanford)

Hab India · Nilgiris

"The above are the dimensions of the largest specimen found It is, however, possible that this shell may attain a greater size The sole Indian species to which it appears to be related is Sp (Bul) gracilis, Hutt, from which, however, it may be easily distinguished by its very obtuse apex, less numerous whorls, etc' (Blanford)

327 Prosopeas terebrale. Theobald

Stenogyra (Opeas) terebrales, Theobald, J A S B xxxix, 1871, p 401, Nevill, Hand List, 1, 1878, p 106, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 321

Bulumus (Stenogyra) terebralis, Pfeiffer, Mon Helic Viv vin, 1877,

p 133

Prosopeus terebrale, Pilsbry, Man Conch ser 2, xviii, 1906, p 31

Original description:—"Testa elongata, imperiorata, tenui, cornea, non polita, anfractibus $10\frac{1}{2}$, depresse convexis, sutura impressa junctis, confertim striatis, ultimo tertiam longitudinis vix æquante, epidermide scabra, perist acuto, margine columellari brevissime reflexo, leviter torto

"Long testæ 95 [=24 mm], lat max 17 [=45 mm], alt. aperturæ 22 unc" [=575 mm] (Theobald)

aperturæ 22 unc" [=5 75 mm] (Theoba Hab Burma Shan States (Fedden)

328 Prosopeas walkeri, Renson.

Spiracis walkers, Benson, A. M. N. H. ser. 3, vi., 1863, p. 90. Pfeisfer, Mon. Helic. Viv. vi., 1868, p. 189, Hanley & Theobald, Couch. Ind. 1874, pl. 79, for 4.

Conch Ind 1874, pl 79, fig 4

Opens valkers, Theobald, J A S B xxxxx, 1871, p 395, Godwin-Austen, P Z S 1895, p 443, Blauford, Proc Malac boc London, v, 1903, p.280

Stenogyra (Opeas) walkers, Nevill, Hand List, 1, 1878, p 165
Stenogyra (Spiraris (Euspiraris)) walkers, Pfeiffer & Clessin,
Nomencl Helic Viv 1881, p 323

Prosopeas walkers, Pilsbry, Man Conch ser 2, xviii, 1906, p 29, pl 6, fig 70

Original description — "S testa, imperforata, cylindraceo-turriti, arcuato-striatissima, sub epidermide albida, spira gracili, apice obtuso, sutura profundiuscula, anfractibus 9, convexiusculis, apertura obliqua, elliptica, margine dextro tenui, acuto, superne arcuato, columellari calloso, subito revoluto

"Long 14, diam. 3½ mill" (Benson)

Hab Andaman Islands Port Blan (Haughton), Cocos Island, Andaman Island (Stoliczka) Burma Shan States (Fedden)

Siam Lampun (Daly)

Some specimens from Port Blan, presented by R MacAndrew to the British Museum, are smaller than the type, for, although possessing nine whorls, they measure only 12 × 3 mm.

329 Prosopeas pealei, To you.

Opeas (Bulimus) pealer, Tryon, Amer Journ Conch v, 1869, p 110, pl 10, fig 5

Bulimus pealer, Pfeiffer, Mon Helic Viv viii, 1877, p 128

Stenogyra (Spiraxis (Euspii alis)) pealei, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 323

Prosopeas pealer, Pilsbry, Man Conch ser 2, xviii, 1906, p 29, pl 6, hgs 80, 81

Original description .—"Shell turreted elongate, slender, rather solid, whorls eight, flatly convex, suture slight, apex papillary; aperture ovate, small, hip simple, columella perpendicular, forming an angle with the lip at the base Light greenish houn-color, white within

"Length 35, diam 9 mill" (Tryon)

Hab Andaman Islands.

"Resembles Bulimus elongatulus, Pfr, but may be distinguished from it by the whorls being less convex and the columella straight

instead of incurved ' (Tryon.)

The type-specimen is figured by Pilsbry, who states that it differs from P haughtons, Bens, to which it has been referred as a synonym, by the non-sinuous columella, which does not form an angle with the parietal wall, by the narrower mouth, more numerous whorls and slenderer shape He further compares it with the var oxynter of Benson, which, while nearly as slender as pealer, differs by having the columella at an angle with the parietal wall

330 Prosopeas haughtoni. Benson

Spuares haughtons, Benson, A M N H ser 3, v., 1863, p. 90; Pfeiffer, Mon Helic Viv vi, 1868, p 189, Hanley & Theobald, Conch Ind 1870, pl 19, fig 1

Stenogy a (Prosopeas) haughton, Nevill, Hand List, 1, 1878, p 173; Godwin-Austen, P Z S 1895, p 443

Stenogy a (Spiraris (Euspiraris)) haughton, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 323

Prosopeas haughton, Pilsbry, Man Conch ser 2, xviii, 1906, p 28, pl 6, figs 76, 78, 79

pl 6, figs 76, 78, 79

Original description —"S testa imperforata, oblongo-conica, subturrita, solida, striata, versus suturam et apicem costulatostriata, albida, epidermido olivacea minutissime corrugata induta; spira elongato-conica, versus apicem obtusiusculum subito attenuata, sutura impressa, anfractibus 7, vix convexiusculis, subplanulatus, ultimo ad peripheriam subingulato, apertura vix oblique, ovato-elliptica, intus ca ruleo-albida, margine destro tenui, acuto, columellari calloso, planato, expansiusculo, versus besin leviter emarginato marginibus cello tenui expanso junctis

"Long 20-30, diam 10-11 mill.; ap long, 11, lat. 5 mill "

(Benson.)

Hab. Andaman Islands Port Blair (Haughton); Andaman

Island (Stoliezka, Roepstorff, Nevill)

"Two typical examples of this species before me measure length 27, diam. 107, length of aperture 105 mm, and 28, 11, 107 mm, both having a trifle over seven whorls. They are solid, strong shells, nearly denuded of the thin, obvaceous-yellow cuttele. The columella is distinctly sigmoid, and the parietal callus arising from it is wholly appressed at the edge, not raised seam-like as in P. pealer (Pilebry)

Var oxynter, Benson A M N H ser. 3, xi, 1863, p 90. Hanley & Theohald. Couch Ind 1871, pl 79, fig. 5 (var unnamed). Pilsbry, Man Conch. ser. 2, xvm, 1906, p 28, pl 6, figs 77, 82-84

"Testa elongato-turrita, graciliore Long 30, dram 8 mill There is a fundancy in the stouter form to verge towards the variety which I have called oxymter, although the extreme specimens might be considered as separate species" (Benson)

Hab Andaman Islands Port Blair (Haughton)

Two specimens referable to this form are figured by Pilsbry He states that "the cuticle is dark olive. They differ from I' pealer chiefly in the shape and direction of the columellar margin, which is less sinuous than in P laughtons. Length 32, diam 10, length of specture 10 mm, whorls 83."

331 Prosopens achates, Morch

Bulunus (Prosopens) achates, Morch, Journ Conchel 1875, p. 359
Stenogyra (Prosopens) achates, Nevill, Hend List, 1, 1678, p. 173
Stenogyra (Opens) achates, Pfeiser & Clessin, Nomence Helic Vis. 1881, p. 320

Prosopers achates, Pilshry, Man Couch ser 2, xvm, 1906, p 27, pl 12, figs 4, 5

Original description —"Differt a præcedente [B (Pr) roepstorfi] testa minore, abbreviata, obtecte perforata

"Long 14 mill , lat 5; long up care 6" (Morch)

Hab Nicobar Islands (Stoliczka). Kamorta, Nancouri (Roepstorff), Kamorta, Katchal, var B (Roepstorff); Nancouri, var y (Roepstorff)

Morch quotes Stenogyra achainacea, Pfeiser, as a synonym, without, as Prof Pilsbry apily says, explanation of so irregular a course. The latter figures a Nicobar shell which he considers to be referable to Morch's form. "It is rather obese below, sub-

negularly tapering to the obtuse, smooth apex, sculptured with narrow, spaced, thread-like riblets which curve forwards above the periphery and are much weaker below it. Whoils slightly more than seven, moderately convex. The aperture is long, the outer lip arched forward above, and the columella reflexed narrowly, leaving a narrow umbilical fissure. Length 13.3, diam. 4.5, length of aperture 5.5 mm.

"This form seems to differ from P achatinaceum by its larger

aperture " (Pilsbry)

Nevill also was of opinion that it differed from the latter (Hand

List, i, 1878, p 173)

Morch records a variety β from Kamoria, Katchal, as smaller, rather smooth, length 11, width 9, length of aperture 5 mm, and a var. γ , from Nancouri, as rather solid, length 13, width $4\frac{1}{8}$, length of aperture 4 mm

332 Prosopeas roepstorffi, Morch (em)

Bulimus (Prosopeas) roepstorfi, Mörch, Journ Conchyl 1876, p 358. Stenogyra (Prosopeas) roepstorffi, Nevill, Hand List, 1, 1878, p 173 Stenogyra (Opeas) ropstorfi, Pteissen & Clessin, Nomencl Helic Viv 1881, p 320

Prosopeas roepstorf, Pilsbry, Man Conch ser 2, avin, 1906, p 27, pl 3. figs 97-99

Original description — Stenogyra elongatula, "Pfr," Martens, l c [Pieuss Exp O-t-Asien, Zool, 11, 1867] p 379, t 22, f 12, affinis, sed differt T. straminea, costulato-striata, suturis profundis, apertura dilatata, fere ficiformi, faucibus albis, columella torta, imperforata

"Long 22½ millim, diam. 6, long apert 7½" (Morch)

Hab Nicobai Islands (Stoliczka); Kamorta (Roepstorff), Little

Coco Island (Wood-Mason)

The species remained unillustrated until Prof Pilsbry figured a specimen. It contains "nearly 8 whorls, the first globose and smooth, the test moderately convex and sculptured with forwardly arcuate, thread-like stime. The aperture is quite oblique, long and narrow, the thin outer lip arched forward, the columellar lip narrowly reflexed above and imperfectly appressed. The columella is concave, slightly folded at the upper insertion Length 16, diam, 47, length of aperture 52 mm."

Genus ZOOTECUS, Westerlund

Zootecus, Westerlund, Fauna Palaarct Binnenconchyl III, 1887, pp 3, 75, Martens, Arch Naturg IVI. 1895, 1, p 103, pl 8, figs 5, 6 (Jaw and radula, Stenogyra insularis), figs 7, 8 (St pulla), Pilsbry, Man Conch sei 2, viii, 1906, p 104 Chilogymnus, Jousseaume, Mém Soc Zool France, vii, 1894, p 289.

[&]quot;Shell rather small, pale or white, perforate, pupiform, cylindric

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with conic summit or cylindric tapering, composed of 7 to 10 compactly coiled whoils, the last rounded below, striate or decussate, glossy. Summit conic, entire, the protocoich striate like the following whoils, not bulbous. Axis slender and straight, narrowly perforated throughout. Aperture small, widely ovate, the peristome thickened, blunt, columellar margin straight or concave, with reflexed edge, continuous with the basal lip. Reproduction vivipurous. Dentition Achatinoid" (Pilsby)

Tire, Pupa insular is

Range Cape Verd Isles and the Sahara eastward to Arabia,

India, and Burma, chiefly in and or barren regions.

"A group of small, Pupiform snails, largely eremitic in habits, generally occurring in large numbers, and varying within wide limits in size and degree of taper. Most gatherings from one place show shorter and longer individuals, as in Holospira and Cerion, the diameter remaining more constant for any one colony. The proportion of diameter to length is therefore individually variable. There is a good deal of local variation in size and texture, and hence a superabundance of names.

"The group was instituted by Westerlund as a section of Buliminus Kobelt, in his great monograph of the Buliminude, also leaves Zootecus therein, though uncertain as to its position Bourguignat struck nearer the mark in referring the species to Rumina, for I find the dentition to be of the Stenogyroid type It is, however, not closely related to Rumina, which differs markedly by its smooth, globose protoconch and attenuated, cylindric, subsequent nearic whorls Riebeckia is perhaps the nearest akin to Zootecus Opeas and its brood belong to another line of differentiation

'Captain Hutton found the large Indian form (pullus) to be viviparous, three or four young shells lying in the oviduct. I have confirmed this by opening dry shells of Z insularis. The young are ovate-conic, perforate, of two or three whorls, and like the adults have the columella entire below.

"There seems to be only two well-marked species, but

Z. insulares has a multitude of local races" (Pilsbry)

Von Martens figured and described the jaw and radula of Zootecus visularis and Z pullus, attributing them to the genus Stenogyra He observes, moreover, that the name Zootecus should be spelled Zootocus, but this procedure is inadvisable as the name would in that case clash with Zootoca, Wagler, 1830 (Reptilia), and I prefer, therefore, to adopt Westerlund's mode of spelling, as Pilsbry has done

333. Zootecus insularis, Ehrenberg

Pupa insularis, Ehrenberg, Symb Phys Anim Evert ser 1, Moll 1831, decas prima, signature d, third page, Pfeiffer, Mon Hehc Viv 11, 1848, p 307

No 6, genus Papa, Hutton, J A S B in, 1831, n. 85: No 6.

Pupa (mihi) exlindrical - ibid, tom cit p 93

Bulimus (Cylindrus) meularis, Albers, Die Heliceen, 1850 p 180 Bulimus insularis, Pfeisler, Mon Helic Viv in, 1853, p 403, ibid, Conch -Cab, Bulimus, 1854, p. 125, pl 36, figs 26-28, Hanley & Theobald, Conch Ind 1870, pl 22 fig 10, Bourguignat, Ann Sci Nat, Zool ser. 6, vv, 1883, art 2, p 65

Chondrus (Mastus) insularis, Adams, Gen Rec Moll, ii, 1857,

p 165

Bidiminus (Cylindrus) insularis, Jicheli, Nova Acta K Leop-Carol Akad Wiss xxvii, no 1, 1874, p 108, pl 5, fig 4, Kobelt, Conchyl Buch, 1, 1878, p 273, pl 84, fig 21

Papa (Cylindrus) insularis, Nevill, J.A. S.B. Nvi, 1877, p 22,

ibid, Iland List, 1, 1878, p 195; ibid, in Anderson, Zool Res Exp W Yunnau, 1, 1879, p 882 Cylindrus insularis, Theobald, J. A. S. B. xlvii, 1878, p 146

Bulimina (Mastus) insulaits, Pfeifler, Nomerel Helic Vit 1831

Rumma insularis, Bourguignat, Moll. Chos, 1885, p 22, Jousseaume

Bull Soc Malac France, v., 1889, p 359
Bullminus (Zoolecus) insularis, Westerlund, Fauna Palaaret Binnenconchyl m, 1887 p 75, Katal Palaaret. Binnenconch 1800, p 92

Buliminus insidaris, Pollonera, Bull Soc Malac Ital vin, 1889 p 70, von Martens, Nachr Deuts Malak Ges 1889, p 151, Smith, Proc Malac Soc London, i, 1894, p 142

Chilogymnus insularis, Jousseaume, Mem Soc Zool France, vii,

1894, p 289

Stenogyra insulares, von Martens, Arch Naturg Ivi, 1895, I, p 103,

pl 8, figs 5, 6 (jaw and radula)

Bulimunes (Mastus) usularis, Pollonera, Boll Mus Zool Torino, xm, 1898, no 313, p 6, Perle, Journ Bombay Nat. Hist. Sec vi. 1908, p. 131

Zootecus insularis, Pilsbry, Man Conch. ser 2, xvin, 1906, p 106 pl 26, fig 21

O. umal description - Puna insularis, subcylindrica, apice attenuata, subacuta, mitida, albido-cornea, subtilissime transier-e striata, striis apicem versus augustioribus, pellucida, apertura semiovata, margine paululum reflexo, leviter calloso, anfractibus 7 ad 8, tribus primis diametro subrequalibus

"Max sp. long. 51 lin , lat 13, 8 spire anfr. Alia sp 51 long.,

17 lata, anfr. 7." (Ehrenberg)

Hab Cameran Island, Red Sea (typo locality, Ehrenberg) India. Bellin, Bundelkund (Hanley & Theobald); Kudapah, Tinali (Stolic La. Patna (Mainicai ing); Northern and Central India (Theobald Hutton); Saharunpore (Wood-Mason), Kutch and Sind (Stolic La Blanford); Poona (Blanford, Fairbank); Salt Range and Lat Sambhur (Theobald, Wynne); Burwani Hills (Blanford); Rajput (na (Haclett); Kashmir (Theobald); Bombus Island (Pelle); Trichmopoli (Nevill, Blanford) Burma Pogan (Anderson, Nevill) Ceylon (Nevill, Blanford, Simon)

Zootecus insularus and its varieties have a very wide range outside the Indian region, extending, according to Pilsbry, from the ZOOTICES. 369

Cape Verde Islands and Senegambia eastward to Egypt, Abyssina, Southern Arabia, to B duchistan. To the somewhat cursors original description, he ands the following particulars. "The sculpture consists of fine, close, subvertical strim, a little bent near the suture, and intersected by soveral (usually three to six) very narrow smooth spiral bands. These may be obsolete on the last whorl on two, though usually persistent. The whorls are mode rately consex, the last ascending a trifle to the aperture. The outer hip is somewhat thickened inside, giving the appearance of a low white well behind it externally. The edge itself is obtuse but not expanded. The columnlar margin is dilated, thickened, and arches over the very small umbilicus. The species is excessively variable, but the typical form is small, specimens measuring as follows.—

"Length 10, diam above aperture 3.8 mm., whorls 83 "Length 9, diam above aperture 3.3 mm., whorls 73 "Length 8, diam above aperture 3.2 mm., whorls 73

"This small form is common in Arabia and India. The shell is thinner and usually more whitish-corneous, less opaque-white than

the large forms

'Shells of the same general type but more robust have been found in both Africa and India, and numerous nominal species have been based upon them. It is quite likely that some of these may be found to be local races worthy of recognition by name."

234 Zootecus estellus, Benzon.

Hulinus erellus, Benson, A. M. N. H. ser 2, xix, 1857, p. 327, Pfeiffer, Mon. Helic. Viv. 18, 1859, p. 462, Hanley & Theobald, Conch. Ind. 1870, pl. 22, fig. 1

Papa (Cylindrus) anen'arrs, var estellus, Nevill, Hand Last, i, 1678, p. 165

Butanna (Mastus) estella, Pfeisser & Clessin, Nomencl Helic. Viv. 1681, p. 293

Bulirannia (Zootecus) estellus, Kobelt, Conch-Cab, Fam Buliminidae, 1900, p 675, pl 102, figs 16, 17

Original description —"Testa arcti perforata, oblonga, cylindrica, subremote spiraliter sulculosa, interstitus confertissime costulato striolatis, albida; spira cylindrica, apice conico, acutinsculo, sutura impressa, anfractibus 8 vix convexiusculis, ultimo antice ascendente, j teste parum aquante, basi circa perforationem leviter impressa, apertura verticali, angulato-ovali, peristomate obtuso, margine columellari verticali, incrassato-reflexo

"Long 18, diam 6 mill" (Benson)

Hab India Sind (Baker), Kudapah, Balmir, Jodhpore

(Stoliczka)

"At once distinguishable from the allied B. pullus, Gray, by its stouter form, and by the ascent of the last whorl near the aperture" (Benson)

335 Zootecus pertica, Benson

Bulimus pertica, Benson, A M N H sei 2, xix, 1857, p 328, Pierstei, Mon Helic Viv iv, 1859, p 462, Hanley & Theobald, Conch Ind 1870, pl 22, fig 7

Pupa (Cylindrus) pertica, von Martens, Die Heliceen, ed 2, 1860,

p 297

Bulimina (Mastus) pertica, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 293

Buliminus (Zootecus) pertica, Kobelt, Conch-Cab, Fam Buliminudae, 1900, p. 682, pl 103, fig 9

Zootecus insularis, var pertica, Pilsbry, Man Conch. ser 2, xviii,

1906, p 113, pl. 26, fig 23

Original description :—"Testa imperforata, exacte cylindrica, elongatissima, confertissime arcuato-striolata, sulcis nonnullis inconspicuis spiraliter sculpta, alba, spira cylindrica, apice conico, obtusiusculo; sutura impressa; anfractibus 10 subplanulatis, ultimo ‡ testæ æquante, antice leviter descendente, basi rotundata, apertura valde obliqua, pyriformi; peristomate tenui, margine basali incrassato, subeffuso, columellari expanso, appresso.

"Long. 20, diam 5 mill" (Benson)

Hab. India (Buker), Sind (Hanley & Theobald).

At once distinguishable from Z. pullus and its allies by its lengthened cylindrical form, its slenderness, and by the obliquity of the aperture. It may be considered as the extreme form of the series. According to Nevill it is based on an abnormal specimen of Z. polygypatus

336. Zootecus polygyratus, Reeve

Bulimus polygyratus, Reeve, Conch. Icon v, 1849, Bulimus, pl 79, fig 578, Pieiffer, Mon Helic Viv in, 1853, p 404, Issel, Mem Real Accad Sci Torino, ser 2, xxii, 1866, p 416

Chondrus (Mastus) polygyi atus, Adams, Gen Rec Moll 11, 1855,

p 165

Bulimus (Cylindrus) polygyratus, Pfeiffer, Malak Blatt 11, 1856, p 155

Mastus polygyratus, Chenu, Man Conchyl 1, 1860, p 442, fig 3246

Pupa (Cylindrus) insularis, var polygyrata, Nevill, Hand List, 1,

1878, p 195

Bulimina (Mastus) polygyrata, Pfeiffer & Clessin, Nomencl Helic
Viv 1881, p 293

Rumma polygyrata, Ancey, Bull. Soc Malae France, 111, 1886, p 63

Zootecus polygyratus, Kobelt, Conch.-Cab., Fam Buliminidae, 1902, p 947, pl 132, figs 26, 27

Zootecus insular...s, var polygratus, Pilsbry, Man Conch ser 2, xviii, 1906, p 113, pl 26, fig 31

Original description — "Shell pyramidally turreted, minutely umbilicated, whorls nine to ten in number, rather narrow, rounded, finely plicately striated, columella reflected, aperture small, hip simple, bluish-white." (Reeve)

Rohra Hills, Sind (Blanford) Beluchistan Hab India Gwadar (Blanford). Persia Bendes Abbris (Issel) Arabia Aden

(Blanford)

When described and figured by Reeve the habitat was unknown. It is more cylindrical than Z. insularis, forming a connecting link between that and Z pertica. The type, which is in the British Museum is composed of 91 whorls and measures. length 12 mm. diameter 4 mm

337 Zootecus pullus, Gray

Bulmus pullus, Gray, P Z S 1834, p 66, Th Muller, Syn Test Viv Anno 1834 promulg, 1836, p 15, Pfeisler, Mon Helic Viv. n, 1848, p 162, Reeve, Conch Icon v, 1849, Bulmus, pl 67, ing 476, Blanford, J A S B xxxiv, 1865, p 94, Adams, Journ

Conch vii, 1892, p 81

Pupa, No 6, Hutton, J A S B iii, 1834, p 85

Pupa cylindrical?, Hutton, J A S B iii, 1834, p 93

Pupa indica (Benson), Hutton (nom mut) (not P indica, Pfeisser,

Bulimus (Opeas) pullus, Albers, Die Heliceen, 1850, p 175
Pupa (Cylindrus) pulla, von Martens, Die Heliceen, ed 2, 1860, p 297, ibid, Malak Blatt xv, 1868, r 160 (= P cylindrica,

Bulimina (Mastus) pulla, Pfeisier & Clessin, Nomencl Helic Viv

1881, p 293

Rumina milla, Ancey, Bull Soc Malac France, in, 1886, p 61 Stenogyra pulla, von Martens, Arch Naturg Ixi, 1895, I, p 103, pl 8, figs 7, 8 (law and radula)

Zootecus insularis, var pullus, Pilsbry, Man Conch ser 2, xvin, 1906, p 110, pl 26, figs 26-28

Original description .- "Bul testa ovata, subcylindrica, subimperforata, pellucida, albida, tenuiter striata, apice conico, obtusiusculo, pellucido, anfractibus novem vel decem vix elevatis; apertura parva, subrotunda. semilunata; labus subincrassatis rotundatis

"Axis 10, diam 4\frac{1}{4} \lin' (Gray)

Hab India Bank of Ganges (Royle, teste Müller), Ala (Blanford); Delhi, Bundelkhund (Reeve), Kutch, Agra, I'richinopoli (B M)

Gray, who omitted to indicate the habitat when describing the species, states that it resembles B. kingu, but is more solid and has a dark apex and pillar. His brief description may be supplemented by Hutton's observations on the species in 1849, when he substituted the MS name Papa undica of Benson for P cylindrica proposed by himself in 1834, on account of the latter name having previously been employed by Michaud

"The large variety has 9-10 whorls; is cylindriform and tapers suddenly to an obtuse apex; colour of living shells pale fuscous or earthy, but generally white, whorls closely wrinkled by coarse waving lines of increase, in fresh specimens faintly scored with

2 B 2

obsolete longitudinal furrows; shell wide, polished, thick and Aperture subquadrate, margins thickened and subreflected; varying from 11 to 12 inches in length. Animal dusky.

ovo-viviparous.

"Var. A .- This is in all respects a perfect miniature of the foregoing, but it never seems to have more than eight whorls, and seldom exceeds 1 an inch in length, it is far less ventricose and generally shows the obsolete longitudinal furrows more plainly This variety occurs both in India and near Quettah in Afghanistan.

~ Var B - With the general sculpture of the last, but shorter, seldom exceeding 7 of an inch; whorls ventricose and spire more suddenly obtuse than either of the foregoing, with scarcely more than half the length of P. indica, it still rivals it in breadth, and the longitudinal furrows appear to be constant and better defined

Whorls usually seven in number, rarely eight." (Hutton)

Specimens from Kutch, presented by A T. Daniel to the British Museum, possess 91 whorls and measure 16×5 mm, others, composed of eight whorls, only reach a length of 14 mm, with a diameter of 5 mm.

338 Zootecus agrensis, Kuri.

Bulimus agrensis, Kurr, Molak Blütt 11, 1856, p 107, Pfeisfer, Novit Conch ser 1, 1, 1856, p 57, pl 16, figs 9, 10, 1bid, Mon Helic Viv 1v, 1859, p 463, Hanley & Theobald, Conch Ind 1870, pl 23, fig 1

Bulinius (Cylindrus) agrensis, Pfeiffer, Malak Blatt 11, 1856, p 155 Pupa (Cylindius) agrensis, von Martens, Die Heliceen, ed. 2, 1860,

Bulimma (Mastus) agrensis, Pfeiffei & Clessin, Nomencl Helic Viv 1881, p 293

Bulimmus (Zootecus) agrensis, Kobelt, Conch-Cab, Fam Buliminidae, 1901, p 686, pl 103, fig 19

Zootecus unsularus, var agrensus, Pilsbry, Man Conch. ser 2, xviii, 1908, p 111 pl 26, figs 24, 25

Original description - "T. perforata, cylindraceo-turrita, lævigata, nitida, alba; spira elongata, sursum sensim attenuata, apice acutiuscula; sutura impressa; anfr. 9 convexiusculi, ad suturam striati, ultimus 1 longitudinis non attingens, antice subascendens, bası rotundatus; apertura verticalis, rotundato-lunaris, perist simplex, rectum, margine dextro leviter arcuato, columellari subverticali, anguste fornicatim reflexo

"Long 46, diam 6 mill., ap. 5 mill longa, 31 lata" (Kurr)

Hab India Agra (Kurr).

Apparently a rare species, which differs from Z. insularis in being smoother and in having the later whorls distantly radiately plicate-structe, the aperture is also a little more transversely elongate

339. Zootecus chion. Pfeiffer.

Bulinus chion, Pfeister, P Z S 1856, p 332, ibid, Mon Helic Viv iv, 1859, p 463, Hanley & Theobald, Conch Ind 1870 pl 22 fig 1, Adams, Journ Conch vii, 1892, p 81

Pupa (Cylindrus) chion, von Martens, Die Heliceen, ed. 2, 1860.

p 297

Pupa (Cylindrus) insularis, var chion, Nevill, Hand List, 1, 1878,

Bulimma (Mastus) chion, Pfeiffer & Clessin, Nomencl Helic Viv

1881, p 293

Rumma chion, Ancey, Bull Soc Malac France, iu, 1886, p 60. Mastus chion Ancey, Bull Soc. Zool France, xvii, 1893, p 44 Bulimmus (Zootecus) chion, Kobelt, Conch-Cab, Fam Bulimmdae, 1900, p 675, pl 102, fig 18

Zoolecus insularis, forma chion. Pilsbry, Man Couch ser 2, xvm.

1906, p 112, pl 26, hg 32

Original description - B testa perforata, oblonga, solida, striatula, alba : spira elongata, in conum acutiusculum terminata, anfr. 7-8 modice convexis, ultimus \(\frac{1}{3} \) longitudinis paulo superante antice subascendente, basi rotundato, apertura verticalis, ovatolunari; perist calloso, marginibus callo nunctis, columellari brevi. substricto, dilatato, patente

"Long 12, diam 54 mill Ap oblique 44 mill longa, fere 3

lata" (Pfeiffer.)

Hab India Kurrachee, Punjab (Shipley, Stoliczka, Adams), Kutch, and Soliman Range (Stoliczka); Umarkote, Sind (Blanford), Saharunpore (Wood-Mason) Afghanistan (Ancey)

Specimens from Hyderabad, presented by Dr. Falconer to the

British Museum, measure 14 × 6 mm

Pfeiffer mentions a var B "Gracilior, minor; long 11. diam. 4 mill "

Family FERUSSACIDÆ.

Genus CÆCILIOIDES, Herr mannsen

Acicula, Risso, Hist. Nat. Europe Mend 1v, 1828, p. 81 (eburneu only species), non Acucula, Hartmann, 1821.

Caecilioides, Herrmannsen, Ind Gen Malac. i, 1846, p 150, for Cecilioides, Férussac

Cacilioides, Smith, Journ Conch vi, 1891, p 342, Pilsbry, Man. Conch ser 2, xx, 1908, p 1

Cacdianella, Bourguignat, Rev. Mag. Zool viii, 1856, p. 378, Fagot, Bull Soc. Malac France, iv, 1887, p. 49, Norman, A. M. N. H. ser 6, vi, 1890, p 337.

Acculma, Westerlund, Fauna Palaarkt. Binnenconch in, 1887, p 175 (as section of Cacalianella)

TYPE, Buccinum acicula, Muller.

Range India and most tropical and subtropical countries and Europe.

"The shell is imperforate, very small and slender, very narrowly lanceolate, with obtuse, rounded, smooth apex; smooth, fragile, transparent (weathering to opaque white); aperture usually less than half the total length, piriform, outer lip arching forward in the middle, acute; columella concave, more or less distinctly truncate at base, usually somewhat calloused. Animal blind, or at least without pigmented eves. Jaw composed of many narrow plaits. Radula with 11,1,11 teeth in C acicula, 18,1,18 in C. gundlachi, the central tooth much smaller than the laterals, with a tricuspid reflection. Laterals symmetrical, tricuspid. Marginal teeth low, wide, with two low denticulate cusps. The genitalia, as figured by Lehmann for C acicula, have the duct of the spermatheca very short. An appendix, enlarged at the end is terminal on the penis. There is also a short accessory organ anteriorly to the penis." (Pilshi y)

Subgenus GEOSTILBIA, Crosse.

Geostilbia, Crosse, Journ Conchyl xv, 1867, p 184, Pilsbiy, Man Conch sei 2, xx, 1908, p 43 (as section of Cacilioides)

TYPE, G. caledonica, Crosse

Range. India, Philippine Islands, New Caledonia, Hawanian Islands, West Indies, New Jersey, St Helena, East Africa, Mauritius, Seychelles, Comoro Group, Nossi Bé

Differs from typical Carrhoides in having the columella not

distinctly truncate, and having the outer lip thickened

The subgenus consists of a small number of species, some of them of doubtful status. Two species are known from India Some seem to owe their distribution to tropical cultivation, possibly that of sugar cane, in a manner similar to that of Opeas gracile and Subulina octona.

340. Cæcilioides balanus, Reeve

Achatma balanus (Benson), Reeve, Conch Icon v, 1850, Achatma, pl 20, fig. 109, Pfeifier, Mon Helic Viv. 111, 1853, p 506, 1bid, Conch-Cab, Bulmus, 1860, p 315, pl. 25, figs 18, 19. Benson, A. M. N. H. ser 3, x111, 1864, p 137, Hanley & Theobald, Conch Ind 1875, pl 102, fig. 10. Blanford, J. A. S. B. viv, 1875, p 43

Glandana balanus, Morelet, Journ Conchyl 111, 1852, p 34

Oleacina (Ferussacia) balunus, Adams, Gen Rec Moll. 11, 1855, p. 106

Achatma (Caeceloides) balanus, Pfeiffer, Malak Blätt 11, 1856, p 170

Cionella (Acicula) balanus, von Martens, Die Heliceen, ed 2, 1860, p 261

Francesia balanus, Paladilhe, Ann Mus Civ Genova, iii, 1872, p 11

Caecilianella (Geostilbia) balanus, Nevill, Hand List, 1, 1878, p 162, Geostilbia balanus, Theobald, J. A. S B. xlvii, 1878, p 147.

Cionella (Cechoides) balanus, Pfeisser & Clessin, Nomencl Helic Viv 1881, p 335 Cacilioides (Geostilbia) balanus, Pilsbry, Man Conch ser 2, xx, 1908, p 46, pl. 4, figs 60, 61

Original description —"Shell cylindrically oblong, somewhat fusiform, whorls four in number, smooth, shining, apex obtuse, columella arched, truncated, aperture small, dull white" (Reeve)

Hab India. Agra (Boys), Banks of the Jumna, near Humeerpore, Bundelkhund (Benson), Kattiwar, near Agra (Theobald); Deccan and Sind (Blanford, Theobald); Kashmir (Theobald)

"T. subcylindraceo-acicularis, laevigats, hyalina, spira subcylindracea, vix attenuata, obtusa, anfr. 4 planiusculi ultimus 2 longitudinis subaequans, basi dilatatus; columella substricte recedens ad basin aperturae late angulato-ovalis vix truncata; perist simplex, rectum, acutum

"Long 3, diam vix 1 mill, ap. 13 mill longa." (Pfeiffer)
Blanford was of opinion * that the shell described by Crosse as
Geostilbia caledonica;, from New Caledonia, was co-specific with
balanus but the figure of the former does not lend any colour
to this view

341 Cæcilioides bensom, sp n

Shell narrowly cylindrico-conoid, almost fusiform, rather thin, opaque white, smooth and glossy Spire narrow, with straight sides, suture linear, submarginate, apex obtuse. Whorls 6, flattened, increasing slowly at first, the last four very rapidly



Fig 121 - Cacilioides benson:

Aperture oblique, pyriform, the margins united by a thin callus on the parietal wall; peristome slightly thickened, outer margin straight, obliquely descending and curving forward basal margin regularly curved, columella slightly curved and slightly truncate

Length 5, diam 1 25 mm

Hab India Plains Type in the British Museum

This new species differs from C balanus, besides being con-

^{*} J A S B xlw, 1875, p 43 † Journ Conchyl xv, 1867, p 186, pl 7, fig 4

siderably larger, in having a wider base, and the whorls increase less rapidly at first, while the basal margin of the aperture is more curved

Genus COILOSTELE, Benson

Collostele, Benson, A. M. N. H. ser 3, xiii, 1864, p. 136, Pilsbry, Man Conch. ser 2, xix, 1908, p. 338.

Cælestele, Blanford, J. A. S. B. xlv, 1875, p. 42

Cælestele, Bourguignat, Descr. div Esp. Cælestele et Paladilhia, 1880, p. 6.

Type, C. scalaris, Benson.

Range India, Aden, Syria, Abyssinia, Egypt, Southern Spain.

Mexico (? introduced)

"Shell minute (3 to 4 mm long), fragile, somewhat transparent, imperforate, long and narrow, subcylindric, or tapering slightly to the very obtuse rounded summit, composed of 6 to 8 flattened whorls separated by deep sutures. the first 2½ or 3 whorls smooth, the rest either smooth, striate, or ribbed Aperture small, oblong, more or less oblique, the outer lip usually expanded slightly in fully adult shells, straight in profile. Columella having a low fold at its junction with the parietal wall Internal partitions absorbed in adult shells, leaving only the internal spiral cord along the sutures Soft anatomy unknown

"A genus of uncertain position, remarkable for the cylindrical shape of the minute, fragile, slender shell, and the absorption of the internal partitions, which I have verified in *C. tampicolensis*. They have been found up to this time only as dead shells in the drift débris of rivers and streams, where they occur in great profusion though it seems quite locally. Nothing is known of the

life-history or soft parts' (Pilsbry)

The genus has a rather remarkable distribution. The occurrence, however, in Mexico of a single species may be due to importation from Spain, as suggested by Prof Pilsbry. A fossil species from the Eocene of Italy has been referred to Collostele*, and, if correctly so assigned, the centre of the distribution of the genus may possibly be that region.

342 Collostele scalaris, Benson.

Collostele scalaris, Benson, A. M. N. H. ser 3, xiii, 1864, p. 136, Hanley & Theobald, Conch. Ind. 1876, pl. 156, fig. 5, Pilsbry, Man Conch. ser 2, xix, 1908, p. 339, pl. 50, fig. 3.

Collostele scalaris, Blanford, J. A. S. B. xlv, 1875, p. 42, Theobald, op. cit. xlvii, 1878, p. 147; Nevill, Hand List, i, 1878, p. 162, Tryon, Struct. Syst. Conch. iii, 1884, p. 95, pl. 102, fig. 79.

Collestele scalaris, Bourguignat, Descr. div. Esp. Collestele et Paladilhia, 1880, p. 10

^{*} Coclostele cocacua, Oppenheim, Zeits Deuts Geol Gesells xlvii, 1895, p 119, pl 3, fig 10

Original description .- "C testa imperforata, elongato-cylindrica, lævi, hyalina, intida; spira elongata, gradatim scalariter attenuata, apice obtuso, sutura profunda, anfractibus 6, convexiusculis, superne obtuse angulatis, penultimo cylindraceo. apertura subobliqua, semiovata, subpyriformi; peristomate tenui, recto, marginibus remotis, margine columellari crassiusculo, plica spirali obliqua elongata superne intrante munito

"Long. 3. diam vix 1 mm. Apert 3, lata 1 mm." (Benson) Hab. India Humeerpore, Bundelkhund, banks of Juinna and Betwa Rivers (Benson); Kashmir (Theobald); Sind (Blanford)

The British Museum contains three specimens, the only ones I have seen labelled "Northern India"; they measure length 4 mm. diam. 15 mm.

Genus GLESSULA, von Martens

Electia, Albers, Die Heliceen, 1850, p. 194 (as section of Achatma), only species, A ceylamca (non Electra, Lam 1816, non Electra, Steph 1829, non Electia, Loew, 1845), Adams, Gen. Rec Moll i, 1855, p 105 (as subgenus of Oleacina), Pfeiffer, Malak. Blatt

11, 1856, p 168 (as section of Achalma)

Glessula, von Martens Die Heliceen, ed. 2, 1860, p 254 (as subgenus of Cionella, type A genma, Benson, Pfeisser & Clessin, Mon Helic Viv 1881, p 329, Nevill, Hand List, 1, 1878, p 166 (as subgenus of Stenogyna), Beddome, Proc. Malac Soc London, vii, 1906, p 160, Pilsbry, Man Conch ser 2, xx, 1908, p 50, pl 15, figs 2, 3 (anatomy)

Type, Achatina centanica, Pfeiffer.

Range' India, Ceylon and Burma, South-Western China, Farther

India. Sumatra, Java, and Borneo. East and West Africa

"The shell is imperforate, ovate-conic or turrite, brown or corneous-brown, glossy, and usually without strong sculpture, apex obtuse Aperture irregularly oval; outer lip unexpanded, acute or blunt; columella short, more or less deeply concave,

abruptly truncate at the base.

"Sole without distinct median area; no pedal margin, an outer mantle lobe on the left side. Kidney very long, band-like Genitalia peculiar; there is a feather-like gland where the vas deferens enters the penis The latter contains a short conic, perforated papilla, and two longitudinal folds The prostrate gland of the hermaphrodite duct consists of entirely separated narrow follicles, as in Achatina. The spermatheca has a short duct Uterus containing several large shells with fully 2 whorls

"The jan is very finely striate, almost smooth Radula has about 110 teeth in a transverse row. The central tooth is very small, tricuspid, laterals with three cusps; outer marginal teeth very finely 3- or 4-cusped (G. orophila, from Madras, according

to Semper)

"Glessula was associated with "Cionella" (that is the Terus-BACIDE as herein understood) by Professor von Martens in 1860. Various other authors, both before and since, have thought the group Achatmoid, belonging to "Stenogy, a' in the former wide limits of that term We know too little of its anatomy to give a definite opinion, but the presence of a glandular appendage (appendix or flagellum) at the end of the penis is a feature unlike any Achatimida The homology of this appendage is not certain The position of the ureter is unknown I have been unable to obtain alcoholic material necessary for an investigation of the relations of Glessula to Subulina, Homorus, Bacillum, and Pseudoglessula

"In most (but perhaps not all) species, the lip becomes slightly blunt and smooth in fully adult shells, thereby differing from

Subuling, which has an acute lip at all stages of growth.

"In G orophila, Semper found in the uterus 4 large embryos with shells having fully two whoils, and a small one with a half whorl and very large caudal vesicle. Various other species have been found to be viviparous, while others bring forth globular eggs like those of Subulina Lake that genus, also, the Glessulæ

reproduce before attaining full size

"Glessula has been studied mainly by specialists on the Indian Benson, W T. Blanford, Beddome, and Godwin-Austen Blauford's 'Contrihave chiefly contributed to the literature butions to Indian Malacology,' continued through many years of the Journal of the Asiatic Society of Bengal, contain a great mass of information on this genus, as on many others of the Indian Hanley and Theobald illustrated most of the types of Benson, amongst others, in their 'Conchologia Indica' Finally, Colonel R H Beddome has recently reviewed the genus in his 'Notes on Indian and Ceylonese Species of Glessula'

"From the purely conchological standpoint we may be said to have an extensive knowledge of Glessula, yet various characters of the first importance have been neglected. The embryonic whorls of the types must all be re-examined and their sculpture described Our ignorance of the embryonic sculpture of many forms prevents any natural classification of the species The surface of the later whoils in all the species should be examined under high power, since some species have a minute sculpture not visible with an

ordinary hand-lens

"No fossil species of Glessula are known to me" (Pilsbiy)

343 Glessula tenuispira, Benson.

Achatina tenuisma, Benson, J. A. S. B. v., 1836, p. 353, Pfeiffer, Mon Helic Viv. ii, 1848, p. 262, Reeve, Conch. Icon. v., 1849, Achatina, pl. 16, fig. 76; Benson, A. M. N. H. ser. 3, v., 1860, p. 464, Pfeiffer, Conch. Cab., Bulimut., 1860, p. 310, pl. 25, figs. 6, 7. Blanford, J. A. S. B. xxxiv, 1865, p. 95. Subulina tenuisma, Adams, Gen. Rec. Moll. ii, 1855, p. 110. Achatina (Subulina) tenuisma, Pfeiffer, Malak. Blatt. ii, 1856, p. 169.

p 169

Achatina (Electra) temarpira, Hanley & Theobald Couch Ind. 1870, pl 30, fig 8,

Stenning (Glessula) tenutspira, Novill, Hand List, 1, 1878, p. 169 Stenogyra (Subulena) tem ispira, Pleiffer & Clessin, Nomenel Helic.

Vii. 1841, p. 327 Glescula tenuir, nra. Beddome, Proc. Malac. Soc. London, vn. 1900. p. 160., Pilsbry, Man. Couch. ser. 2, xx, 1909, p. 88, pl. 9, h.gs. 1, 4

Original description —" Testa clongato-turrita, cornea, longitudinaliter stricts, sersus apicem attenunta, columnari, anfractu ultimo interdum fracija guibuedam albidia transpersia ornata. Buturis impressis apiec obtuso

"Long 1 noil, (=25 mill) circuter, let, 0.55 f = 14 mill"

(Benesa)

Hale India Salhet (Benson), Darjeeling (Stolical a, Blanford, & Mariorring), & Canara (Bedeloine), Khasi and Daffa Hills (Godiem Auster) Burma Abouting and further south (Blanforth: broke of Irrundily (Thechald)

He measurement given by Benson-width 0.55 inch-is evia talle a lapsus or a printer's error for 0.25, as the Cumingian specimens measure 7 mill, i.e. a trifle over 1 meh, the length

being 25 mill, a little exceeding one mali, therefore

Many specimens found in collections are evidently immature The B dilone collection contains a shell, composed of fourteen whorly, which me repres 41.5 mm, in length and 9 mm in diameter.

344 Gleszula baculina, Blauford

Glessi'a becelina, Blanford, J. A. S. B. xl, 1871 p. 43, pl. 2, fig 6. Beddome, Proc Malac Soc London, vii, 1906, p 160 Achatma (1 betra) baculi in, Hanley & Theobald, Couch Ind 1874, pl 78, fig 6

Achatina baculina, Pfeiffer, Mon Helic Viv viu, 1877, p. 291 Stenogura (Glesinla) beculina, Ni vill, Hand List, 1, 1878, p. 170 Stenaggen (Subulina) becalina, Pfoiffer & Clessin, Nomencl Helic Vie. 1881, p. 327.

Glerenla tenniepica, var baculina, Pilsbry, Man Conch ser 2, xx, 1990, p 84, pl 0, 6g 2

Original description -" Te-ta clongato turrita, gracilis, tenuiuscula, oblique atricta, fusco vel fulvo cornes, epidermido nitescente induta. Spira turrita, apice obtusulo. Anfrictus 131, parum context; inferiores subequales, autura impressa, minute dehti-Apertura obliqui, ovito-triangularis, peristoma simplex, Columella abrupte arcunta, oblique producta, ad basin verticalites truncats " (Blanford)

Alt 38 mm, diam 65-75 mm Aperiuræ · alt 7, lat 4 min Sikkim Himalayas, Khersiong (Stolicela), Darjeeling

(Blanford, Manuaring), Klinst Hills (Godwin-Austen)

"This species appears to have escaped the notice of all previous collectors in Sikkim, it was found in association with its near ally G. tenuspira, Bens, by Dr Stoliczka during a recent visit. It is easily distinguished from the latter species by its slenderness (the diameter being \(\frac{1}{6} \) of the length), and the comparative narrowness of its whorls; moreover, by the form of the columella, the lower part of which is bent abruptly almost at right angles with the slope of the inner lip; while in G. tenuspira, G. erosa, and other allied forms, the curvature is at the utmost obtuse. Specimens, the shell of which has been slightly weathered, shew fine spiral markings, but these are not visible unless the shell has become somewhat opaque The animal is dark leaden grey, somewhat paler at the sides of the foot." (Blanford.)

Beddome thought this only a more slender form of tenuspira, and Pilsbry reduced it to varietal rank, but I consider baculina sufficiently distinct to retain it as a species. The shell is more cylindrical and more strongly striated than tenuspira, while it is distinguished from shiplays in being more shining and in having

the whorls more flattened.

A specimen from Darjeeling, in the Beddome collection, is composed of $12\frac{1}{2}$ whorls and measures 32×6 mm.

345. Glessula pertenuis, Blanford

Achatina pertenuis, Blanford, J. A. S. B. anni, 1865, p. 79, Pfeiffer, Mon. Helic. Viv. vi, 1868, p. 237

Achatma (Electra) pertenuis, Hanley & Theobald, Conch Ind 1870, pl 18, fig. 5

Stenogyra (Glesstila) pertenuis, Nevill, Hand List, 1, 1878, p 169 Stenogyra (Subulma) pertenuis, Pferffer & Clessin, Nomenci Helic.

Viv 1881, p 327

Glessula pertenuis, Beddome, Proc Malac Soc London, vii, 1906,

Glessula tenuspy a, var pertenus, Pilsbry, Man. Conch ser 2, x, 1909, p 89, pl 9, fig 3

Original description — Bhell very slender, turrited, thin, light horny, polished, closely, minutely, and rather irregularly striated. Spire subulate, somewhat acuminate towards the blunt apex; suture impressed, subcrenulate Whorls 11-12, convex, the last about ½ the length of the spire Aperture oblique, ovately pyriform, peristome thin, margins united by a thin callus, columella moderately curved, obliquely truncated (Blanford)

Length 20, diam. $4\frac{1}{3}$, length of aperture 4 mm

Hab Burma Tongoop, Arakan (Blanford); Arakan (Stoliczka), Akoutong (Theobald); Thyet Myo (Hunger ford) India Assam

(Stoliczka), Garo Hills (Godwin-Austen)

"A much more slender species than A tenuspua, Bens (a variety of which also abounds in parts of Pegu), though there are signs of a passage. The present appears to replace A tenuspua in Arakan and Bassein. Mr. Benson, to whom I sent a specimen, observes that it is intermediate between A. tenuspua and A hastula, Bens." (Blanford)

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Beddome considered this species probably an immature form of tenuspira, and Pilsbry regards it as a variety The more flattened whorls and the acuminate upper portion of the spire, however, appear to me to warrant its being accorded specific rank.

Var. major. Blanford

Length 261 mm.; diameter 6; length of aperture 6. Of another specimen: length 23 min; diameter 5%; length of aperture 51 mm.

Hab. Burma · Pyema Khyoung, Bassein district, Pegu

346. Glessula shiplayi, Pfeiffer

Achalma (Subulma) shiplay, Pfeiser, Malak Blätt n. 1855.

p 169

Achatma shiplayi, Pfeisser, Novit Conch ser 1, i, 1850, p 82, pl 22, figs 13, 14, Blanford, J. A S B xxx, 1861, p 364
Achatma (Electra) shiplayi, Hanley & Theobald, Conch Ind 1870,

pl 36, fig 9 Stenomra (Glessula) shiplays, Nevill, Hand List, 1, 1878, p 168 Stenogyra (Subulina) shaplayı, Pfeisser & Clessin, Nomenci Helic. Viv 1881, p 326

Glessula shiplays, Beddome, Proc Malac Soc. London, vn. 1906, p 161; Pilsbry, Man. Conch sei 2, xx, 1909, p 61, pl 9,

Original description .- "T turnts, tenuissima, sublaevigata, pellucida, nitida, cornea; spira regulariter attenuata, apice obtusa, sutura substruata; anfr. 13 convexi, ultimus 1 longitudinis paulo superans, rotundatus, distinctus striatus, columella substricte procedens, basi sublate truncata, apertura parum obliqua, rotundato-ovalis, perist rectum tenussimum" (Pfeiffer.)

Long 252, diam 63 mill Ap. 53 mill longa, 34 lata

Hab India. Nilgiri Hills (Shiplay, Newl); Patchamully and

Kalryenmullay Hills (Blanford); Shevroy Hills (Beddome)

Beddome states that full-grown specimens were very rarely found by him, "though young, balf-, and three-quarter-grown ones are most abundant on the Nilgiris. This and some other species certainly breed before the shell attains full size or a hardened peristome, as I have taken eggs from such shells The peristome differs much in mature specimens, sometimes being very thick and solid, sometimes quite thin, but, even then, firm and not breaking or becoming jagged at the least touch, which is the sign that the shell has not finished its growth. Full-grown examples of shiplayi are very like tenuispica, but smaller The species is, in fact, intermediate between the latter and baculina, but the whorls are more convex and increase more suddenly than is the case in either of the other two species. It also runs nilagrica very closely, but the latter has a stronger sculpture, and is broader at the base"

347. Glessula nilagirica, Reeve (em)

Achatina mlanarica (Benson), Reeve. Conch Icon v, 1850, pl. 21.

Achatina periotteti, var mlagnica, Pfenffer, Mon Helic. Viv. iii. 1853, p 494

Achatma perrotteti, vai, Pfeisser, Conch-Cab, Bulimus, 1800,

p 324, pl 25, figs 2 3

Achatina (Llectra) periotteti, Hanley & Theobald, Conch Ind.
1870, pl. 35, fig 6 (non Pfi)

Stenogyra (Glessula) mlagrica, Nevill, J A S B 1, 1881, p 136. pl ō, fig 15

Gleszula perrottett, var mlagirica, Pfeister & Cleszin, Mon Helic. Viv 1881, p 330

Glessula mlagurca, Beddome Proc Malac Soc. London, vii. 1906.

Glessula milagarica, Pilsbry, Man Conch ser 2, xx, 1909, p 90. pl 9, fig 5

Original -description :- "Shell pyramidally turreted, whorls ten in number, convex, very huely crenulated at the sutures, then striated, columella rather deeply arched, aperture small, brownhorny." (Reeve)

Hab. India: Nilgiris (Jerdon)

"The shell I take to be this species is the one described by Nevill I collected it both on the Nilgiris and Nullamullays It is of the same length and has the same number of (Kurnool) whorls as shiplcyn, and is very like the full-grown shell of that species, only it has a more prominent striation, and is considerably broader towards the base The young shell is conical from a broad base, the young of shiplays being much more cylindrical Reeve's figure, copied by Nevill, is this species, it must be a small form of it It is more probably new ottets" (Beddome)

348 Glessula hebes, Pfeiffer.

Achatina hebes (Blanford), Pfeisser, Mon Helic Viv vi, 1868, p 230, Hanley & Theobald, Conch Ind. 1876, pl 159, hg 2 Glessula hebes, Blanford, J. A. S B xxxix, 1870, p 21, pl. 3, fig 21; Beddome, Proc. Malac. Soc. London, vii, 1906, p 161; Pil-bry, Man Conch ser 2, xx, 1908, p 62, pl 9, fig 6 Achatına (Glessula) hebes, Godwin-Austen, J A S B xlv, 1876, p 315 Stenogyra (Glessula) hebes, Nevill, Hand List, i, 1878, p 167 Stenogyra (Subulina) hebes, Pfeisser & Clessin, Nomencl. Helic. Viv. 1881, p 326

Original description — "T. ventroso-turrita, pertenuis, irregulariter, praesertim ad suturam striata, pellucida, sericina, fulvocornea, spira elongata, apice obtusa; sutura impressa; anfr 10 convexiusculi, ultimus 1 longitudinis subaequans, basi rotundatus; apertura verticalis, rhombeo-elliptica; columella perarcuata, oblique anguste truncata; perist. simplex, tenue

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"Long 17, diam 5 mill Ap oblique 41 longa, 23 lata"

(Pfeuffer)

Deo Ghat, Poona (Evezard), Shevroy Hills Hab Índia (Beddome); Daffa Hills (Godwin-Austen), Pulney Hills (Fair-

bank). Koonoor Pass (Nevill), Mahableshwar (Beddome)

When first described by Pieiffer he was unaware of the habitat of the species, although the specimens were forwarded direct to Cuming by Major Evezard Two years after Blanford again described the species, and, as his diagnosis is based on better and more ample material. I append it

"Testa sub-cylindrico turrita, tenuis, pallido-cornea, translucens, polita, striatula, spira elevata, subtus sub-cylindrica, lateribus versus apicem obtusum convexis, sutura impressa Anfr 9-104 convexi, regulariter crescentes, ultimus brevis, 1-1 longitudinis subæguans Apertura ovato-oblongo, parum obliqua, peristoma tenne: columella valde arcuata, antice oblique truncata

"Long 17-22, diam 5 mill. Ap 4-41 longa, 21-3 lata

"The nearest ally to this species appears to be G. tamulica. W. and H Blant, from near Trichonopoli, which is distinguished by greater diameter in proportion to the length, and a more regularly tapering spire. Intermediate forms may hereafter be found, however

"A specimen from the Shevroy Hills, near Salem in Southern India, sent to me by Major Beddome, only differs from G hebes in being longer and slightly more attenuate towards the apex. It

has 13 whorls " (Blanford)

Beddome expressed considerable doubt as to its distinctness from G fairbanks, stating that all the specimens of G. heles he had seen were young, with unformed lip He adds "If full grown, or nearly so, it must be a much smaller species than shiplan runs the young of that species rather closely, but the apex is Specimens collected by me on the Shevroys generally blunter are referred here by Blanford; they are, however, immature, and appear rather to belong to fairbank, if that species is distinct. which I doubt Hanley's figure of heber has the tapering apex of voung shiplays and is unlike my type of heles

Glessida hebes has the whorls more narrowly coiled than fairbanks; other differences are indicated under the latter. figure given by Blanford is rather poor, the strice being more pronounced Two specimens from the Shevroy Hills, in the Beddome collection, possess 91 whorls, one measures only 12 mm and the

other 13 mm.

349 Glessula fairbanki, Benson.

Achatina fairbanl i. Benson, A. M. N. H. ser 3, xv, 1865, p. 14, Pfeiffer, Mon Helic Viv vi, 1869, p 232 Achatum (Electra) fan banki, Hanley & Theobald, Conch Ind 1870, pl 18, fig 3

Stenogy: a (Subulina) fan banki, Pfeiffer & Clessin, Nomeno-HAK Viv. 1881, p 326 Glessula fan banki, Beddome, Pioc. Malae Soc. London, vii, 1906, p 162, Pilsbry, Man Conch. ser 2, xx, 1908, p. 63, pl 9, fig. 7.

Original description—"A testa subcylindraceo-turrita, striatula, obsolete et minutissime spiralitei decussata, polita, translucente, luteo-cornea, spira veisus apicem ad latera subconvexa, vertice obtuso, sutuia distincte impressa; anfractibus 8, subconvexis, brevibus, 4 ultimis in diametro lente accrescentibus, ultimo subtus rotundato 4 longitudiais æquante, apertura subobliqua, ovata, superne subtusque angulata, marginibus callo junctis, columellari leviter arcuato, oblique truncato, dextro basalique tenuibus.

"Long 12, lat. 4 mill Apert., long. 3, lat. 2½ mill.' (Benson.)

Hab. India. Mahableshwar (Fan bank).

"The nearest Nilgiri form is A. corrosula, Pfr. The more cylindrical form below, the sculpture, shorter whorls, &c., safely distinguish it." (Benson)

"A type-specimen sent me from Mahableshwar by Mr Fairbank, and a few other examples I have seen in the Benson collection and elsewhere, are all young shells with unformed lips It is smaller than hebes, but I cannot point out how it differs

otherwise " (Beddome)

While agreeing that the two forms are closely allied, they appear to me sufficiently distinct to be retained as separate species G. hebes is not only proportionately larger but the last whorl is shorter in proportion to the spire than is the case in fairbanks, a feature which would still further be emphasized if one or two whorls were added to the latter, whereas the reverse would be the case if it were an immature form of hebes. Glessula fairbanks differs from G. hebes principally in the convex upper part of the spire which becomes cylindrical at the last three whorls. It further differs in being more polished, in the strip being much finer, and in the whorls being less closely coiled all, except the last whorl, show numerous opaque, anarrow, spiral lines Hanley's figure of the species is very good.

A specimen in the British Museum, from the type-locality, possesses 81 whorls, but it has the same dimensions as the

type

Major Peile possesses a single specimen from Mahableshwar composed of eight whorks

350 Glessula vadalica, Benson.

Achatina vadalica, Benson, A. M. N. II. ser 3, xv, 1805, p. 15; Pfeiffer, Mon. Helic. Viv. vi, 1868, p. 229
Achatina (Electra) vadalica, Hanley & Theobald, Conch. Ind. 1870 pl. 35, fig. 5

385

Stenogyra (Glessuta) vadatica, Nevil, Hand List, 1, 1878, p 168
Glessula vadalica, Pfeifer & Clessin, Nomencl Helic. Viv 1881,
p 131, Beddoine, Proc Maiac Soc London, vii, 1906, p 162, Pilsbry, Man Conch ser 2, xx, 1908, p 64, pl. 9, fig 11

Original description - "A testa turrito-elongata, striatula, solidula, polita, translucente, luteq-cornea; spira versus apicem convexiusculo-turrita, apice obtusiusculo, sutura impressa; anfractibus 11, convexis, brevibus, superioribus costulato-striatis: ultimo subius rotundato, 1 longitudinis vix æquante; apertura vix obliqua, elliptico-ovata, marginibus callo junctis, columellari leviter arcusto, albido, oblique truncato, dextro basalique tenuibus

"Long 34, diam 9 mill Apert, long 8, lat. 5 mill" (Benson)

Hab India Wadale, near Ahmednuggar (Fan bank)

"The convex sides of the upper part of the spire, the shorter whorls, with the sculpture and polish of this shell, distinguish it as well from the Nilgiri A. perrotteti as from the neighbouring A. notigena, which has an attenuate spire and costulate sculpture in all the whorls." (Benson)

In addition to the above differentiating characters, the last whorl of vadalica is more turned at the base, while in perrotteti it

is more sloping towards the columella

351 Glessula tamulica, Blanford

Achatma tamulica, Blanford, J. A. S. B. xxx, 1861, p. 362 Pfeisler, Mon Helic Viv. vi, 1868, p. 232

Achatena (Electra) tamulica, Hanley & Theobald, Conch. Ind

1870, pl 17, fig 9

Stenogyra (Glessila) tamulica, Nevill, Hand List, 1, 1878, p 168 Stenogyra (Subulma) tamulica, Pfeisser & Clessin, Nomenci Helic

Vn 1881, p 326

Glessula tamulica, Beddome, Proc. Malac. Soc. London, vu., 1906, p 162, Pilsbry, Man Conch ser 2, xx, 1908, p 64, pl 9, bg 12

Original description -" Testa turrita, tenuis, pellucida, nitida. cornea, striatula; spira regulariter attenuata, apice obtusa. anfr. 10 convexi, ultimus 1 longitudinis paulo superans, rotundatus; columella valde arcuata, oblique truncata parum obliqua, subovalis, peristoma simplex, tenue, marginibus callo tenuissimo junctis.

"Long 20, diam 6 mm. Ap 51 alta, 3 lata." (Blanford.)

Hab India · Cullagoody, near Trichinopoli (Blanford)

"Near shiplays, Pfr, but distinguished by the smaller number

of whorls, more obtuse apex, etc." (Blanford)
Beddome states that Blanford's types, his own specimens received from him, and all other specimens he has seen are not mature, the lip being quite fragile, and he considers it very near vadalica, having all the appearance of being the young of that species

While agreeing with Beddome that its affinity is with vadalica. rather than with shiplayi, I do not think tamulica can be the

immature form of the former, being considerably broader at the base, a feature which would be emphasized if another whorl were added. The later whorls, moreover, increase more rapidly than in vadalica, which is more conoid, with straight sides to the spire.

352 Glessula perrotteti. Pferffer.

Achatma per roteti, Pfeiffer, Revue Zool 1842, p 305, ibid. Symb Hist Helic 11, 1842, p 59

Glandina perroleti, Philippi, Abb Beschr Conchyl 1, 1844, p 135,

Glandina, pl 1, fig 12

Achatina perrotteti, Pfeisser, Mon Helic Viv 11, 1848, p 260. ıbıd, Conch -Cab, Bulimus, 1860, p 324, pl 26, figs 16, 17 Achatına (Subulina) per rotteti, Albers, Die Heliceen, 1850, p 195 Oleacina (Electra) per otteti, Adams, Gen Rec Moll 11, 1855. บ 106

Achatina (Electra) perrottets. Pfeiffer. Malak Blatt 11. 1856. p 168

Cionella (Glessula) per otett, von Martens, Die Heliceen, ed 2, 1860, p 254

Stenogy a (Glessula) per ottett, Nevill, Hand List, i, 1878, p 168, ibid, J A S B l, 1881, p 137, pl 5, figs 17, 17 a Glessula per ottett, Pfeiser & Clessin, Nomencl Helic Viv 1881,

p 330, Beddome Proc Malac Soc London, vn, 1906, p 162, Pilsbry, Man Conch ser 2, xx, 1909, p 65, pl 9, figs 9, 10

Original description —" Testa elongato-conica, apice obtusiuscula, nitide cornea, diaphana, sutura profunda; anfractibus convexiusculis, ultimo tertiam longitudinis partem æquante; columella valde incurvata, abrupte truncata, apertura ovali.

"Long. 25, diam 11 mill." (Pfeiffer)

Hab India. Nilgiris (Periotici), Neddoowutton, Nilgiris (Blanford); Pulney Hills (Beddomc)

353. Glessula prælustris, Benson

Achaima prelustres, Benson, A M N H ser 3, v, 1860, p 462, Pfeiffer, Mon Helic. Viv vi, 1868, p 221

Achatma (Electra) pralustres, Hanley & Theobald, Conch Ind 1870, pl 17, fig 6, var fig 7

Stenouvra (Glessula) praelustris, Nevill, Hand List, 1, 1878, p 171

Glessula pralustrus, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 329, Jousseaume, Mém Soc Zool France, vii, 1894, p 293 Beddome Proc Malac Soc London, vii, 1906, p 162, Pribbry, Man Conch ser 2, xx, 1909, p 68, pl 9, figs 15, 16, Annandale, Rec Indian Mus vii, 1912, p 33

Original description: - 'Testa ovato-oblonga, pertenui, fragili, irregulariter plicato-striata, nitente, pallide luteo-cornea, spira pyramidata, apice obtuso, sutura profundiuscula, subcrenulata; anfractibus 81 convexiusculis, supeina prope suturam tumidiusculis; ultimo i testæ superante, subinflato; apertura verticali,

semiovali, latiuscula, columella subrecta, vix curvata, basi oblique truncata, peristomate recto, acuto.

"Long. 33, diam. 17 mill., apert 15 mill. longa, 9 lata"

(Benson)

Hab. India · Midnapore, Balasore, and Cuttack, prov Orissa (Theobald), Ganjam and Raneegunge (Ball, Stoliczka), Paresnath Hills, W Bengal (Annandale), Orissa and Ganjam districts, E Madras (Beddome)

354 Glessula huegeli, Pfeiffer

Achatina hügeli, Pfeiffer, Symb Hist Helic ii, 1842, p 58, Philippi, Abb Beschr Conchyl i, 1844, p 135, Glandina, pl 1, fig 8, Pfeiffer, Mon Helic Viv ii, 1848, p 259, Reeve, Conch Icon v, 1848, Achatina, pl 15, fig 68, Pfeiffer, Couch -Cab, Bulimus, 1860, p 334, pl 29, figs 2.3

1860, p 334, pl 29, figs 2, 3
Achatina (Archachatina) hugelu, Albers, Die Heliceen, 1850,

p 190

Oleacma (Electra) hugeli, Adams, Gen Rec Moll. ii 1855, p 105 Achatma (Electra) hugeli, Pfeisfer, Malak. Blatt ii, 1856, p 168

Hanley & Theobald, Conch Ind 1874, p 33, pl. 78, fig 2
Glessula hügelt, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 331, Beddome, Proc Malac Soc London, vii, 1908, p 162, Pilsbry, Man Conch ser 2, xx, 1909, p 91, pl. 9, figs 13, 14

Original description — "T ovato-turrita, pallide cornea, longitudinaliter striata, nitida, fragili, spira elongata, apice obtusius-cula, sutura profunda; anfr 10-11 planiusculis, ultimo # longitudinis subæquante, apertura oblongo-elliptica; columella valde arcuata, perist simplice, acuto

"Long, 37, diam 13 mill ' (Pfeiffer.)

Hab India Kashmir (von Hugel)

When first described its origin was unknown Kashmir was first given as its habitat by Hanley and Theobald The species is allied to G chesson, but it is more solid in texture The Cuming collection contains three specimens from Kashmir, with a label in Pfeiffer's handwriting

355 Glessula burrailensis, Godwin-Austen.

Glessula burrailensis, Godwin-Austen, J. A. S. B. xliv, 1875. p. 3, pl. 1, fig. 6, Pfeiffer & Clessin, Nomencl. Helic. Viv. 1881, p. 329, Beddome, Proc. Malac. Soc. London, vii, 1906, p. 163; Pilsbry, Man. Conch. ser. 2, xx, 1909, p. 92, pl. 7, figs. 9, 10. Achatina burrailensis, Pfeiffer, Mon. Helic. Viv. viii, 1877, p. 277

Original description — "Shell turreted elongate, solid, in fresh state brown and lustrous, finely longitudinally striated; whorls 10, rather flat, suture shallow, apex blunt, aperture subvertical, fusiform, angular above, peristome very thick, paler brown on margin, columella strong

"Alt 1.37 [=34 75 mm], major diam 0 4 inch [=10 mm.]"

(Godwin-Austen)

Hab India: Peak of Khunho, Eastern Burrail Range; Jappo. 7000 ft

"This species is an extremely elongate solid form of the crassilabris section of Glessula, and one of the most distinct." (Godwin-Austen)

From chessoni it differs apparently in having a more obtuse apex, while from huegeli it may be distinguished by the more flattened whorls and the concave upper part of the spire I have not seen any specimens

356 Glessula butleri. Godwin-Austen

Glessula butlers, Godwin-Austen, J. A. S. B. xliv, 1875, p. 4, pl. 1, fig. 7, Pfersfer & Clessin, Nomencl. Helic Viv. 1881, p. 330, Beddome, Proc. Malac. Soc. London, vii., 1906, p. 163, Pilsbry, Man. Conch. ser. 2, xv, 1909, p. 92, pl. 11, figs. 1, 2 Achatina butleri, Pfeiffer, Mon Helic Viv viii, 1877, p 278

Original description - "Shell elongately turreted, very thin and brittle, tumid, pale corneous, glassy, very minutely striated, apex very blunt; whorls 8, rather rounded, suture deep, bodywhorl swollen and capacious; aperture vertical, pear-shaped, lip rather thin

"Alt. 1 13 [=29 mm], major diam 0 45 inch [=11.25 mm.]." (Godwin-Austen.)

Hab India Eastern Burrail Range, 6000 ft A species I have not seen It is apparently rare

357. Glessula chessoni. Benson.

Achatma chessoni, Benson, A M N H ser 3, v. 1860, p [462, Pfeister, Mon Helic Viv 1868, p 222

Achatma (Electra) chessom, Hauley & Theobald, Conch Ind. 1872,

pl 17. fig, 8

Stenogyra (Glessula) chessom, Nevill, Hand List, i, 1878, p 167 Glessula chessoni, Pfeiffer & Clessin, Nomenci Helic Viv 1881, p 329, Beddome, Proc Malac. Soc London, vii, 1906, p 163; Pilsbry, Man Conch. ser. 2, xx, 1909, p 68, pl 11, fig 5

Original description —"Testa ovato-turrita, superne attenuata, scabre plicato-struata, strips minutissimis confertis obsoletis spiralibus decussata, fulvo-cornea, vel purpureo-fusca, translucente, nitidula, spira turrita, apicem versus obtusiusculum attenuata, sutura impressa, crenulata, anfractibus 11½ convexiusculis, ultimo 1/3 testæ superante inflatiusculo, apertura subverticali, semiovali, latiuscula, columella subrecta, albido-callosa, busi vix oblique truncata, peristomate recto, tenui " (Benson)

Long 37, diam 15 mill; apert 14 mill longa, 8 lata

Hub India Mahableshwar Hills (Chesson, Theobald); Igatpuri (Stoliczka), Torna and Purandhar (Blanford, Fairbank); North Canara forests and Sircee (Beddome)

This species is allied to G. huegeli but the spire has a more acuminate apex with concave sides and a broader base, it is also thinner in texture and the suture is more crenulate

A shell in the Theobald collection, from Mahableshwar, is in very fresh condition and shows rather irregular incised spirals Three specimens from the same locality, in the Cuming collection, are darker in colour, they measure 30 x 10 5 mm. The Beddome collection contains three shells from Poons, one of which has, 111 whorls and measures 34×12 mm, while another possesses 12 whorls and attains a length of 365 mm, with a diameter of only 11 mm

358. Glessula tornensis, Blanford

Glessula tornensis, Blanford, J. A. S. B. xxxix, 1870, p. 22, pl. 3 for 22, Pfeiffer & Clessin, Nomenci Helic Viv. 1881, p. 320, Beddome, Proc. Malac. Soc. London, vii, 1906, p. 163, Pilabry, Man Couch ser 2, xx, 1909, p 69, pl 11, figs. 3, 4
Achalma (Electra) tornensis, Hanley & Theobald, Couch Ind. 1674, pl 78, fig 3 Achatena tornense, Pfeisser, Mon Helic. Viv viu, 1877, p 278

Stenogyra (Glessula) torneners, Nevill, Hand List, 1, 1878, p 167

Original description - "Testa orato oblonga, tenuiuscula, levigrata, mitida, polita, sub-obsolcte strintula, falvo cornea, spira elongato conoidea, lateribus convexis; apice valde obtuso, sutura impressa, superne sub-corrugata Anfr 7-73 convexi, ultimus 3 longitudinis superins, subtus rotundatus Apertura sub-verticalis, oblongo semiovalis, peristoma rectum, teune, marginibus callo tenui junctis; columella valde arcuata, albescens, antice fere verticaliter truncata.

"Long 25, dram. 14 mill, apert oblique 12 mill longa, 7 lata"

(Blanford.)

Hab Inder Torne Hell, Poons (Evezard, Blanfo.d), Anamul-

lays, Tunnevelly, and Travancore Ghats (Beddome)

"This rather fine species abounds on the hill mentioned, where it has been procured in large numbers by Major Evezard. I only found a few specimens myself. It is amongst the finest of the species of Western India In form it is remarkably similar to G. textiles, W Blauf., from the Anamullay hills, but it entirely wants the coloured markings of that species" (Blanford.)

Beddome observes in connection with the species: Travancore specimens were labelled subtorners s by Nevill, but I cannot see how they differ I took a very beautiful dark chocolate-

coloured variety on the Calcad Hills in Tinnevelly."

I have been unable to find the Travancore specimens referred to by Beddome, but of three Anamuliay shells, labelled subtornensis, two undoubtedly pertain to G tornensis, while the third, which differs in several respects, has been made the type of subtornensis

Four specimens from Poona, also in the Beddome collection, range in size from 27×135 mm to 26×14 mm, while two shells from Torna Hill, in the Theobald collection, measure $26.5 \times 14 \text{ rm}$

359 Glessula subtornensis, sp. n.

Shell-oblong-conoid, rather thin, translucent, very finely striated, smooth and strongly polished, pale corneous. Spire conoid, with straight sides, suture impressed, subcrenulate; apex rather prominent, very slightly obtuse, almost acute. Whorls 8, scarcely convex, slightly shouldered above, increasing rather slowly and regularly at first, the last three rather suddenly; last whorl nearly equalling in width \(\frac{2}{5} \) of the entire length of the shell. Aperture subvertical, broadly truncately semi-oval; peristome scarcely thickened, outer margin scarcely curved and descending nearly vertically, basal margin deeply curved, columella arcuate, forming an obtuse angle at the junction with the parietal wall, very obliquely truncate at the base; the margins united by a thin callus

Length 26.5 mm, diam. 15 mm.

Hab India Anamullays (Beddome) Type in the British



Fig 122 — Glessula subtornensis

Differs from G. to nensis in having a much more acute apex and a broader base; the spire in consequence is acuminate in the upper part instead of convex as in its ally. The earlier whorls are also more closely coiled, and the suture is less distinctly crenulate; finally the shell is less solid and more shining.

I found three shells, labelled subtornensis, Nevill, MS., in the Beddome collection. Two of these, however, proved to be simply tornensis, while the third has been made the type of the new

species.

360. Glessula textilis, Blanford.

Achatina textilis, Blanford, J. A S B xxxv, 1866, p 41, Pfeiffer, Mon Helic Viv vi, 1868, p 220

Achatina (Electro) testile, Hanley & Theobald Couch Ind 1870.

Achatina (Electra) textilis, Hanley & Theobald, Conch. Ind. 1870, pl. 17, fig. 10

Stenogyra (Glessula) textulis, Nevill, Hand List, 1, 1878, p 168 Glessula textulis, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 329, Beddome, Proc Malac, Soc London, vii, 1906, p 163; Pilsbry, Man Conch ser. 2, xx, 1909, p 69, pl 11, figs 6, 7

Original description.—" Shell ovate-oblong, rather solid, translucent, striated near the suture, smooth, polished, dark chestnut

with close vertical and horizontal lines of a greyish-yellow colour, varying in breadth and resembling the threads of an irregularly woven cloth. Spire elongated, conoidal with convex sides, apex obtuse, sutures impressed. Whorls 7, convex, the last about $\frac{2}{5}$ of the entire length, rounded beneath. Aperture vertical, truncately semioval, milky within, peristome slightly thickened, white, right margin slightly sinuate towards the base, columella deeply curved, obliquely truncated beneath, margins united by a thin callus

"Length 26, diam. 13 millim Aperture 101 mill. long,

7 broad." (Blanford)

Hab. India Anamullay Hills, 6000 ft (Beddome, Stoliczka); Pulney Hills (Fairbank); Tinnevelly and Travancore Ghats, South

Canara (Beddome); Mahableshwar (Peile)

"This is the only indigenous Indian Achatina with which I am acquainted, possessing coloured markings—In form it approaches some of the Ceylon Achatina, and also an undescribed Deccan species." (Blanford.)

"Varies in diameter from 10 to 14 mm I have specimens from the Tinnevelly Chats in which the textile colouring is reduced to a single narrow band on each of the three lower whorls, or is

entirely obsolete " (Beddome.)

The species is variously ornamented with dark spiral bands and lines, but occasionally specimens occur without either. One shell from South Canara, in the Beddome collection, exhibits some indistinct spiral lines and in addition some opaque transverse lines. Another shell from the Pulney Hills, in the same collection, measures length 30 mm, diameter 135 mm., while two specimens from Tinnevelly are dark fuscous, without bands but with a narrow pale sublateral zone, they consist of 6½ whorls and measure 255×14 mm.

361 Glessula subserena, Beddome

Glessula subserena, Beddome, Proc. Malac Soc London, vn, 1906, p 166, pl 15, fig. 7.

Glessula jeyporensus Pilsbry (non Beddome), Man Conch ser 2, xx, 1909, p 75, pl. 8, figs 13, 14

Original description — "Testa ovato-turrita, solidiuscula, politissima, obsolete striatula, fulvo-cornea, pellucida; spira subturrita, apice obtusato, sutura impressa, marginata, crenulata; anfractus 7 planiusculi, ultimus ½ longitudinis vix æquans; apertura semiovalis, columella valde arcuata, albido-callosa, marginibus callo junctis, ad basin abrupta et oblique truncata

"Long. 22, diam. 11 mm, apertura 10 mm longa, 5 lata"

(Beddome)

Hab India · Peermede (Travancore), Sispara, Nilgiris, S Canara,

and Anamuliays (Beddome)

"The last whorl is longer, and the spire less elevated than in the Ceylonese seiena, and the whorls, especially the upper ones, are less convex" (Beddome.) Prof Pilsbry, in copying Beddome's figures, has unfortunately interchanged the numerals on the plate of the present species and G. jeyporensis.

G. subserena is allied to G textilis but is devoid of the spiral

bands and lines of the latter

The Beddome collection contains several shells from the typelocality and two from Sispara, one of which is dark fuscous and a little more conoid than the type, it has $6\frac{1}{2}$ whorls and measures $21 \times 11 \cdot 25$ mm. The same collection contains three specimens which were labelled *G. inoi nata*, from S. Canara, but which pertain to the present species. Of these two, composed of $6\frac{1}{2}$ whorls, measure 20×9 mm, while the third, of $7\frac{1}{2}$ whorls, attains a length of 25 mm, with a diameter of 11 mm.

362. Glessula indica, sp. n.

Shell oblong-conoid, rather thin, translucent, finely striated, smooth, slightly polished, pale corneous. Spire elongate conoidal, with straight sides, suture rather deep, apex acute. Whorls 9, convex, increasing rather slowly and regularly, last whorl less than $\frac{2}{3}$ of entire length. Aperture vertical, truncately semi-oval; peristome slightly thickened, corneous, onter margin regularly curved, columellar margin rather wide, deeply curved, obliquely truncate at the base; margins united by a thin callus.

Length 25 5, diam. 11:5 mm

Hab. India: Tinnevelly Hills, type (Beddome), Anamullay Hills (Beddome). Type in the British Museum.



Fig 123 —Glessula indica

This new species is based upon five specimens labelled G. textilis, in the Beddome collection (British Museum) It differs from that species in the shell being of a thinner texture, in being smoother but less polished, in the spire having straight sides, and in the apex being more acute. The whorls are also more numerous and more closely coiled, the last whorl being consequently less high in proportion to the entire length of the shell. One of these

shells possesses only eight whorls and measures 20×9.5 mm; it is ornamented with a single, narrow, fuscous, supra-peripheral band below which occur several fuscous spiral lines. The Beddome collection also contains eight specimens from the Anamullay Hills, labelled G subserena, which I refer to the new species. None of these is ornamented with any fuscous spiral bands or lines.

363 Glessula senator, Hanley

Achatina (Glessula) senator, Hanley, P.Z S 1875, p 606
Achatina senator, Hanley & Theobald. Conch. Ind. 1875, pl 155, fig 5, Pfeiffer, Mon. Helic. Viv. viii, 1877, p 616
Glessula senator, Pfeiffer & Clessin, Nomenci. Helic. Viv. 1881, p 331, Beddome, Proc. Malac. Soc. London, vii, 1906, p 163, Pilsbry, Man. Conch. ser. 2, x, 1909, p 70, pl 11, fig. 8

Original description — "T subovato - conoidea, nonnunquam angustior, tenuis, nitida, lævigata, chocolati colore tincta, vitta flavescente seu pallida conspicue ornata Anfractus convexi, multo latiores quam alti (in exemplo imperfecto 6½), celeriter accrescentes, infra suturam valde impressam vitta perangusta, et supra suturam vitta lata (in anfractu ultimo paululum supra medium posita) picti Spira circiter dimidium testæ occupans, apex pallidior, subito obtusus [Columella brevis, pallidior, subito obtusus] Columella brevis, pallida, arcuata, late truncata "Long. 1 inch" (Hanley)

Hab India Cotty am Hills (Hanley); Peermede Hills,

Travancore (Beddome)

The portion of the diagnosis placed in square brackets has evidently crept in through some printer's error and greatly puzzled me at first until this fact dawned upon my mind.

Beddome states that the species only differs from G. textilis

and G. tornensis, both of Blanford, in its beautiful coloration

Four specimens in the Beddome collection; from Peermede, only differ from G textiles in having a broad pale zone just above the periphery, while some have narrow subsutural lines and a patch on the columella. Hanley's figure of the species is more considerable than these

364. Glessula 1sis, Hanley.

Achatma (Glessula) isis, Hanley, P. Z. S. 1875, p. 606
Achatma isis, Hanley & Theobald, Conch. Ind. 1875, pl. 155, fig. 5;
Pfeiffer, Mon. Helic. Viv. viii. 1877, p. 616
Stenogyra (Glessula) isis, Nevill, Hand List, i, 1878, p. 108
Stenogyra (Subulma) isis, Pfeiffer & Clessin, Nomencl. Helic. Viv. 1881, p. 325
Glessula isis, Beddome, Proc. Malac. Soc. London, vii, 1906, p. 163,
Pilsbry, Man. Conch. ser. 2, xx, 1909, p. 71, pl. 11, fig. 9

Original description —"T. turrito-subcylindracea, lævis, tenuis, nitidissima, albida seu pallida, nonnuuquam vitta augusta fulva,

lineis perparvis fulvis confertis circumcincta. vitta variabilis seu sæpius versum basim anfractuum superiorum et supra medium ant. ultimi posita. Anfractus circiter 10, convexi, sensim acciescentes, ad suturam profundam sub lente obsolete subcrenati, multo latiores (ultimo excepto) quam alti apex obtusus. Apertura angusta, quartam partem totius altitudinis paululum superans. Columella brevis, arcuata, oblique contorto-truncata

"Long. 1\frac{1}{3} poll. [=32 mm], lat \(\frac{2}{7} poll \) [=7 mm.]" (Hanley.)

Hab S India (Hanley), Pulney Hills (Fairbank, Beddome).

"The hair-like lines and narrow fillet seem peculiar to the species: the fillet, however, is neither constant, nor fixed as to position" (Hanley.)

According to Beddome Glessula isis has much the colouring of G textilis, but the shell is very different in form, being elongated

and narrow.

365. Glessula subperrotteti, Beddome

Glessula subperrotteti, Beddome, Proc Malac Soc. vii, 1906, p 163, pl 15, fig 1, Pilsbry, Man. Conch. ser 2, xx, 1909, p 71, pl 8, hgs 1, 2

Original description — "Testa ovato-turrita, superne attenuata, nitidissima, leviter plicato-striata, fulvo-cornea; spira turrita, apicem versus obtusiusculum attenuata, sutura impressa, crenulata, anfractus 9, vix convexiusculi, ultimus \(\frac{2}{3}\) test\(\frac{1}{3}\) sub\(\frac{1}{3}\) quans; apertura semi-ovalis; columella subrecta, albido-callosa, peristomate recto, tenui, marginipus callo albido junctis.

"Long 28, diam, 9 mm.; apertura 10 mm longa, 5 lata."

(Beddome.)

Hab India: Travancore Hills, above Calcad.

"Intermediate between chesson, Bens. and periotici, Pfr. The sculpture is much less prominent than in the former." (Beddome.)

The British Museum possesses a specimen, received from the late Colonel Beddome, which is more conoid than the type, since

it is only 265 mm long, while the diameter is 10 mm

366 Glessula canarica, Beddome

Glessula canarica, Beddome, Proc Malac Soc London, vii, 1906, p 164, pl 15, fig 4, Pilsbry, Man Conch ser 2, xx, 1909, p 72, pl 8, figs 7, 8

Original description:—"Testa turrito-oblonga, tenuiuscula, spira oblonga, apice obtuso, politissima, purpureo-fusca, distincte et confertim subcostulato-striata, sub lente confertim decussata, sutura impressa, anfractus 9, subplaniusculi, ultimus \(\frac{2}{5} \) longitudinis æquans; apertura verticalis, oblongo-semi-ovalis, peristoma tenue; columella valde arcuata, antice fere verticaliter truncata

"Long. 25, diam. 9 mm.; aperture 8 mm. longa, 4 lata."

(Beddome.)

GLESSULA 395

Hab India South Canara Ghats (Kudra Mukh)

"In its blunt oblong spire it resembles the large form of amentum as figured by Hanley. It is a beautifully sculptured shell." (Beddome.)

The species is somewhat variable in the length of spire for some shells in the Beddome collection, with a diameter of 95 mm, measure 25 mm. in length, while others with the same diameter only attain 235 mm

367. Glessula anamullica, Blanford

Achatma anamullica, Blanford, J. A. S. B. xxxv, 1866, p. 37, Pfeiffer, Mon. Helic. Viv. vi, 1868, p. 223

Glessula anamullica, Pfeiffer & Clessin, Nomencl. Helic. Viv. 1881, p. 329, Beddome, Proc. Malac. Soc. London, vii, 1806, p. 164, Pilsbry, Man. Conch. ser. 2, xx, 1909, p. 72

Original description — "Shell turrito-ovate, thin, finely striated, horny with high vitreous lustre Spire turrited, sides convex, apex obtuse, suture impressed Whorls 8, scarcely convex, the last rounded beneath Aperture oblique, peristome thin, columella moderately arcuate, obliquely truncated below.

"Length 27, diam. 12 millim Aperture 10 millimetres high,

61 broad ' (Blanford.)

Hab India Annmullay Hills and Travancore Hills (Beddome) "Intermediate in character between A nilagarica, Bens and

the oblong ovate Achatina of Ceylon" (Blanford)

"Though a good many of this fine dark chocolate-coloured species were taken, none of them had a firm lip, and though eggs taken from some of them, they are probably not full-grown. It is not very like any one species, the nearest to it being perrottetiz" (Beddome)

Two specimens in the Hungerford collection in the British Museum are pale corneous, opaque, with narrow spiral bands; while possessing, like the type, eight whorls, they only measure 26.5×10.5 mm. Some Travancore specimens, presented in 1906 to the British Museum by the late Colonel Beddome, have the peristome very thin, they consist of 7½ whorls, the largest measuring only 24×10 mm. The Beddome collection further contains shells, also from Travancore, composed of eight whorls, and which only measure 26×10.5 mm.

368 Glessula inornata, Pfeiffer.

Achatina mornata, Pfeisser, P Z S 1851, p 259, Pfeisser, Mon Helic Viv 111, 1853, p 490, 1bid, Conch-Cab, Bulimus, 1860, p 322, pl 26, figs 8, 9, pl 37, figs 1, 2 (var) Oleacina (Electra) mornata, Adams, Gen Rec. Moll 11, 1855,

Achatma (Electra) mornata, Pfeiffer, Malak Blätt 11, 1856, p 168; Hanley & Theobald, Conch Ind 1872, pl 17, fig 2, var fig 3 Stenogyna (Glessula) mornata, Nevill, Hand List, i, 1878, p 171. Glessula monnata, Nevill, Enum Helic Ceylon, 1871, p. 3, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p. 329, Jousseaume, Mém Soc Zool France, vii, 1894, p. 292 Beddome, Pioc Malac Soc London, vii, 1906, p. 164, Pilsbry, Man Conch ser 2, xx, 1908, p. 53, pl. 6, figs. 10, 11, 14-17

Original description — "A testa turrito-oblonga, solida, confertim striata, pallide fulva, strigis saturatioribus variegata; spira turrita, apice obtusiuscula, sutura lævi, confertissime crenulata, anfractibus 7½, planiusculis, ultimo ½ longitudinis subæquante, basi vix compresso, læviore, columella peraicuata, albo-callosa, oblique abrupte truncata; apertura sinuoso-semiovali, intus alba; peristomate simplice, obtuso, margine dextro repando.

"Long. 28, diam 11 mill" (Pterffer.)

Hab. Ceylon (Layard), Kandy (Newll, Simon), Matelle East and Ma Ellia (Layard). India South Canara forests (Beddome)

Var. minor. Beddome, 1 c. p. 164

Ceylon (Beddome)

369 Glessula lankana, Pilsbiy

Glessula lankana, Pilsbry, Man Conch. sei 2, xx, 1908, p. 54, pl 7, figs 1-3

Original description — "Shell oblong-turrite, thin but rather solid, yellow or tawny, with some narrow darker or chestnut streaks on the spire Surface very glossy, finely and deeply stricte, the strice unequal, in places being as narrow as the intervals, but occasionally much wider. Under the compound microscope a very faint spiral striation is visible, the spirals being weakly beaded in places. The first 2½ whorls are smooth. Spire conic with straight sides and obtuse apex. Suture irregularly crenulate. Aperture vertical, flesh-tinted inside. Outer lipobtuse, forming a regular arch. Columella moderately concave, obliquely truncate at base.

"Length 27 2, diam 11, length ap. 10 mm, whorls $8\frac{1}{3}$

"Length 27, diam. 11.2, length ap 10.5 mm; whorls $8\frac{1}{3}$." (Pilsbiy)

Hab Ceylon: Matelle District (Layard)

"Closely related to G inormata, but more glossy and having much less distinct microscopic granulation. The outlines of the spine are straighter; there are more whorls in the same length, and the aperture is smaller. G beddomer has a more prominent and more deeply truncate columnla" (Pilsbry)

370. Glessula submornata, Beddome.

Glessula submornata, Beddome, Proc Malac Soc London, vii, 1906, p 164, pl 15, fig 3, Pilsbry, Man. Conch ser 2, xx, 1909, p 73, pl 8, figs 5, 6

Original description .- "Testa oblongo-turrita, solida, confertim

striata, striis minutissimis obsoletis spiralibus decussata, fulva, nitida, apice obtusiusculo, sutura leviter impressa, confeitissime crenulata, anfractus 8. planiusculi, ultimus 2 longitudinis aquans, convexiusculus, spira elongato-turrita, columella arcuata, albocallos oblique abrupte truncata, apertura triangulari-semiovata, ıntus albida; peristoma simplex, obtusum

"Long 26, diam 8 mm, apertura 10 mm longa, 5 lata"

(Beddome)

Hab India Sispara Ghat, on the Nilgiris

"Allied to the Ceylonese mornata and parabilis Smaller and narrower than the former, larger and with a more elongated spire than the latter." (Beddome)

Var. minor, Beddome, l. c p 164, Pilsbry, l c p 73.

"Long 21, diam 7 mm, apertura 8 min longa, 4 lata

Brumagherry Hills, Wynaad

"Of a pale steel colour, otherwise only differing in size from the type Very near parabiles, but with a rather longer spine and smaller aperture." (Beddome)

The Beddome collection contains a number of shells labelled "var minor" They consist of 71 whorls and measure 21 mm in length, but with the addition of half a whorl they would equal the type

371. Glessula reynelli, sp. n.

Shell elongate-conoid, rather, thin, opaque, a little shining, finely costulate-striate, covered with a thin deciduous cuticle, pale yellowish corneous, here and there marked with dark corneous or fulvous flammules and transverse streaks ? Spire



Fig 124 —Glessula reynclli 3

convex-conoid, suture rather shallow, crenulated, apex obtuse. Whorls 8, slightly convex, increasing rather rapidly, the last whorl equalling about 1 the entire length of the shell Aperture nearly vertical, obovate-pyriform, the margins united by a thin callus on the parietal margin; outer margin gently curved, basal margin arched, columellar margin regularly curved, obliquely truncate.

Length 26, diam 10 25 mm., aperture length 9, width 5 mm

Hab Ceylon Type in the British Museum

Several specimens presented in 1907 to the British Museum by Mr. H. B. Preston, differ from any known form, and in basing a new species upon them I have much pleasure in dedicating it to a former Secretary of the Malacological Society of London, Mr. Alexander Reynell, who has added considerably to our know-

ledge of the anatomy of many Mollusca.

The new species is unlike any Ceylon Glessula and can only be compared with G beddomer, but that species has a broader base, a concave upper spire, a thicker shell, and is differently coloured, being of a uniform dark fulvous, while the strip are also coarser and stouter. G reynelle varies considerably in size. One shell composed of $7\frac{1}{2}$ whorls measures 22.5×9.5 mm., while another possessing $9\frac{1}{2}$ whorls attains a length of 32.5 and a diameter of 11.5 mm. One specimen, measuring 28×11 mm., has a slightly broader base and is not flammulated like the type

Var immitis, n.

Differs from the type in being dull and lustreless, and in being plicate-structe.

Hab Cevlon India. Anamullays.

Two specimens also presented in 1907 by Mr Preston were labelled G inornata, var, but this form is certainly nearer to G reynelli A specimen in the Beddome collection, labelled G. beddomei, I also refer without hesitation to the present form Several shells of G. beddomei from the Anamuliays, in the Beddome collection, were accompanied by a single specimen which, while approaching that species in colouring and length, differs in having a narrower base, a convex apex and finer stries, characters which induce me to refer the specimen here. It measures 30.5×12 mm

372 Glessula beddomei, Blanford.

Achatina beddomei, Blanford, J A S. B xxxv, 1866, p 41; Pfeiffer, Mon Hehr Viv vi, 1868, p 222, Hanley & Theobald, Conch Ind 1875, pl 102, fig 8, 1876, p 63, pl 156, fig. 4. Stenogyia (Glessula) beddomei, Nevill, Hand List, 1, 1878, p. 168 Glessula beddomei, Pfeiffer & Clessin, Nomercl Helic. Viv 1881, p 329, Beddome, Proc Malac Soc London, vii, 1906, p 165, Pilsbry, Man Conch ser 2, xx, 1909, p 73, pl 11, figs 10, 11

Original description —Shell turrito-ovate, solid, finely and closely sub-costulately structed, dark purplish brown, epidermis ir

399

parts having a tendency to assume a dirty cream colour, especially in dead specimens. Spire convex below, slightly accuminate above, apex obtuse, rather inclined to the right, suture impressed. Whorls 7½-8, convex, the last ½ of the entire length, rounded at the base. Aperture nearly vertical, sub-pyriform, fulky within; peristome thickened, white, outer margin rather straight, not arcuate, columella deeply curved, lined with callus, sub-obliquely and rather broadly truncated at the base

"Length 30, diam 11½ millim Aperture 10 millim long, 6 broad" (Blanford)

Hab India · Anamullay Hills, 5000 to 7000 feet (Beddome)

"This is a more solid form than any of the Nilgiri species, and it differs from all of them, and also from the solid Ceylonese forms, in its sub-acuminate apex. It is a well-marked species." (Blanford)

Beddome records the species from Ceylon, stating that specimens from that island are slightly narrower but do not otherwise differ. I have not seen any Cingbalese specimens which can be referred to G beddomei, the only specimen so labelled in the Beddome collection being a variety of G. reinelli (q, v)

373. Glessula pallens, Beddome

Glessula beddomei, var pallens, Beddome, Proc. Malac Soc. London, vn, 1906, p 165, Pilsbry, Man Conch ser 2, xx, 1909, p 74

Shell ovate-conoid, somewhat thin, finely and closely striated, pale straw-coloured with irregular fuscous transverse streaks, variously spaced Spire convex conoid, suture deep, apex acute



Fig. 125 -Glessula pallens

Whorls 8½, convex, the last equalling 3 the entire length of the shell, convex at the base. Aperture a little oblique, obovate-pyriform, pearly within, the margins united by a thin callus; peristome scarcely thickened, outer margin regularly curved,

basal margin arcuate, columella deeply arcuate and strongly curving forward. obliquely truncated at the base

Length 30.5. diam 13 25 mm

Hab Ceylon (Beddome) Type in the British Museum This form was stated by Beddome to differ from G. beddomei only in being of a straw colour, but I find that the spire is not concave near the apex, the shell is more convex in outline, with a broader base, the strix are more crowded and finer, and the aperture is wider Under these circumstances I have no hesitation in according this form specific rank. A second specimen has more convex whorls and measures 31.5 × 13.5 mm

Beddome hazards the opinion that the present form is G inornata, var B of Pfeiffer*. This statement appears to me to be based on a misconception, for I find a specimen of true mornata occurs in the same box with pallens.

374. Glessula prestoni, sp. n.

Shell cylindro-conoid, rather solid, opaque, a little shining, finely and closely, irregularly costulate-striate, the striæ sinuous near the suture, with excessively minute spirals in the interstices, a shallow groove, bordered by a few irregular spirals below it, runs parallel with and close to the suture from the beginning of



Fig 126 - Glessula preston: 3

the third whorl Spire convex conoid, suture linear, margined. apex obtuse Whorls 8, increasing rapidly, flattened, yellowish corneous with fuscous transverse streaks, the last whorl exceeding a of the entire length of the shell, subangular at the periphery Aperture nearly vertical, obovate, margins united by a thin callus on the parietal wall, peristome thickened, outer margin slightly

^{*} Conch -Cab, Bulimus, 1860, pl 37, figs 1, 2

GLESSULA. 401

curved, basal margin arcuate, columella truncate, slightly curving forward

Length 335, diam 13 mm, apert 12 mm high, 5 mm wide.

Hab Ceylon Type in the British Museum

This species is based upon a single specimen presented to the British Museum in 1907 by Mr H B Preston. Its nearest ally is G. pallens, but it may readily be separated from that species since the spire is less conoid, the whorls are less convex, fewer in number, and increase more rapidly, the strike are less prominent and more crowded, while finally the suture is quite different, being very shallow and margined

375 Glessula bollampattiana, Hanley (em)

Achaina bottampotana (Beddome), Hanley & Theobald, Conch. Ind 1876, pl 156, fig 1

Stenogyra (Glessula) bottampotana, Nevill, Hand List, 1, 1878, p 168

Stênogya (Glessula) bollampattuana, (em.) Nevill, T. A. S. B. 1, 1881, p. 139

Glessula bottampotana, Jousseaume, Mém. Soc Zool France, vii, 1894, p 293, Pilsbry, Man Conch ser 2, xx, 1909, p 74, pl 11 hg 12

Glessula bolumpattiana, Beddome, Proc Malac Soc London, vn, 1900, p 165

Shell ovate-conoid, rather solid, opaque, scarcely shining, finely and closely costulate-striate, the strip cut into minute granules by intersecting fine way spirals, varying from greenish corneous to dark fuscous. Spire conoid, with straight sides, suture shallow, margined, apex acute. Whorls 74-8, flattened, increasing slowly at first, the last two rather suddenly, the last whorl equalling ? the entire length of the shell. Aperture little oblique, obovate, the margins united by a distinct callus on the parietal wall, peristome thickened, outer margin slightly curved, basal margin arcuate, slightly curving forward; columella deeply arcuate, obliquely truncate

Length 22-25, diam 95-105 mm; apert height 9, width

38 mm.

Hab India. Palghat Hills, Madras; Bollampatty Hill (Beddome)
Readily distinguished from all its allies by the finely decussate
sculpture, the costulæ being cut into granules by the spirals

The name of this species has been variously spelt by different authors. The one originally given by Hanley was due to a misreading of the label, and in the amended form it was published in 1881 by Nevill, who stated that Colonel Beddome informed him that it is found on the Bollampatty Hill, near Coimbatore, at 7000 ft., and that the name should be spelt as now given.

The species has never been described and I have drawn up the foregoing diagnosis from a shell in the Beddome collection which

agrees fairly with Hanley's figure

376. Glessula parabilis, Benson.

Achatma parabilis. Benson. A M N. H ser 2, xviii, 1856, p 96:

Pfeiffer, Mon Helic Viv iv, 1859, p 606

Achatina (Electra) parabilis, Hanley & Theobald, Conch. Ind.
1870, pl 35, fig 7

Glessula parabilis, Nevill, Enum Helic Ceylon, 1871, p 3, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p. 330, Jousse-aume, Mém Soc Zool France, vii, 1894, p 294, Beddome, Proc Malac Soc London, vii, 1906, p 204, Pilsbry, Man Conch ser 2, xx, 1908, p 54, pl 7, fig 4

Stenogura (Glessula) parabilis, Nevill, Hand List, 1, 1878, p 171

Original description - "Testa oblongo - ovata, solidiuscula, nitida, rugose striata, striis minutissimis obsoletis spiralibus decussata. sub epidermide luteo-cornea albida, spira elongatoconica, apice obtuso, sutura leviter impressa, subcrenulata; anfractibus 6, subplanulatis, ultimo convexiusculo, 3 testæ vix æquante, apertura triangulari semiovata, intus albida, peristomate leviter inflexo, marginibus callo tenui junctis, dextro sinuato, obtusiusculo, columellari perarcuato, oblique valde truncato

"Long 20, diam 10, long ap 9, lat 5 mill" (Benson) Hab Ceylon (Layard, H Nevill); Kandy (G Nevill); Maturata

Hanley & Theobald state this species is near, if not identical with, A fusca, H Ad

377 Glessula fusca, Pfeiffer.

Achatma fusca, Pfeiffer, P Z S 1852, p 67, ibid, Mon Helic Viv 111, 1853, p. 491, ibid, Conch-Cab, Bulimus, 1863, p. 337, pl 43, figs 8, 9 Oleacina (Electra) fusca, Adams, Gen Rec Moll 11, 1855, p 105. Achatma (Electra) fusca, Pfeiffer, Malak Blatt 11, 1856, p 168 Glessula fusca, Pfeiffer & Clessin, Nomencl. Helic Viv 1881 p 330, Pilsbry, Man Conch sei 2, xx, 1909, p 101, pl 7 figs 14, 15

Original description - "A testa oblongo-turita, tenui, confertissime capillaceo-striata (striis singulis validioribus, variciformibus), sericina, fusca, spira vix curvilineari, apice obtusa, sutura marginata, subtilissime denticulata; anfractibus 7, convexis, ultimo 3 longitudinis æquante, basi rotundato, columella albo-callosa, leviter arcuata, abrupte bieviter truncata apertura verticali, sinuato-semiovali, peristomate simplice, recto "Long 22, diam 9 mill" (Pfeiffer)

The present species is included in the Fauna of British India with some doubt, its habitat being unknown Hanley & Theobald (Conch Ind p 33) considered it near to, if not identical with, G. parabiles, but it differs in the much more contracted aperture. The sculpture is rather striking

378 Glessula ceylanica, Pfeiffer.

Achaina ceylanica, Pfeiffer. Zeits Malak. 11, 1845, p 157, Philippi, Abb Conch 11, 1847, p 214, Achatina, pl 1, fig 3, Pfeitler, Mon Helic Viv 11, 1848, p 258, ibid, Conch-Cab, Bulimus, 1860, p 313, pl 25, figs 14, 15

Achatina (Electra) ceylanica, Albers, Die Heliceen, 1850, p 194, Pfeister, Malak Blatt in, 1856, p 168, Hunley & Theobald, Conch Ind 1870, pl 17, fig 4

Glandina ceylanica, Morelet, Journ Conchyl in, 1852, p 34

Oleacina (Electra) ceylonica, Adams, Gen Rec Moll ii, 1855, p 105 Glessula ceylanica, Nevill, Enum Helic Ceylon, 1871, p 3, Kobelt, Illustr Conchylienbuch, n, 1878, p 276, pl 85, fig 6, Pfeister & Clessin, Nomencl Helic Viv 1881, p 330, Jousseaume, Mém Soc Zool France, vii, 1894, p 292, Beddome, Proc Malac Soc London, vii, 1906, p 165, Pilsbry, Man Conch ser 2, vv, 1908, p 57, pl 6, figs 7, 8

Stenogy a (Glessula) ceylanica, Nevill, Hand List, 1, 1878, p 172;

Tryon, Struct Syst Conch in, 1884, p 61, pl 99, fig 89

Original description —" Testa ovato-oblonga, striatula, sericina, tenui, fulvo-cornea; spira pyramidata, apice obtusa; anfr. 7 convexiusculis, ultimo 🚽 longitudinis aequante, inflato, columella brevi, arcuata, abi upte truncata, apertura latiuscula, semiovali

"Long 16, diam 8 mill" (Pferffer.)

Hab Ceylon (Pempleton, Layard), Balapiti and Colombo

(Nevill); Maturata (Simon)

Beddome found some specimens in the Natural History Museum much larger than he ever came across in Ceylon, measuring 30 mm. long by 14 in diameter

379. Glessula punctogallana, Pfeiffer.

Achatina ceylanica, Reeve, Conch. Icon v, 1849, Achatina, pl. 15,

ing 59 (non Pfr)

Achatina punctogallana, Pfeiffer, Zeit. Malak ix, 1852, p 150. ıbıd, Mon Helic Viv 111, 1858, p 493, 1bid, Conch-Cab, Bulunus, 1860, p 323, pl 26, figs 14 15, Hanley & Theobald, Conch Ind 1875, pl 102, fig 4

Oleucina (Electra) punctogallana, Adams, Gen Rec Moll 11, 1855.

p 106

Achatma (Electra) punctogallana, Pfeiffer, Malak Blätt ii, 1856. p 168

Cionella (Glessula) punctoga lana, von Martens. Die Heliceen, ed 2

1860, p 254

Glessula punctogallana, Nevill, Enum Helic Ceylon, 1871, p 3, Pferster & Clessin, Nomencl Helic Viv 1881, p 330, Jousseaume, Mém Soc. Zool France, vii, 1894, p 292, Beddome, Proc Malac Soc London, vii, 1906, p 165

Stenogyra (Glessula) punctogallana, Nevill, Hand List, 1, 1878,

p 172

Glessula nitens, var, punctogallana, Pilsbry, Man Conch ser 2, xx, 1908, p 56, pl U, hgs 3-5

Original description .—" T oblongo-ovata, 11x striatula, glabra, nitida, pellucida, corneo-fulva, spira pyramidata, apice obtusa,

2 n 2

antr 7½, convexi, ultimus 2 longitudinis subaequans, basi rotundatus: columella perarcuata, longe procedens. abrupte truucata; apertura verticalis, subtriangulari-semiovalis, perist, simplex. margine dextro-regulariter arcuato.

Ap 7 mill longa, 4 lata" (Pfeiffer) "Long. 16, diam 8 mill

Hab Cevlon: Point de Galle (Benson); Balapiti (Nevill)

Is stated by Pfeiffer to differ from his H ceylanica in having a smoother, more glossy shell with longer spire, shorter last whorl, and in the columella being more arched forward His figure of ceylanica in Couch.-Cab, however, has the last whorl actually less high than punctogallana Beddome was unable satisfactorily to distinguish it from ceylanica, except that the latter is generally larger. Pilsbry, on the other hand, reduces punctogullana to varietal rank under G natens. He figures a shell received as ceylanica (pl. 6, fig. 5) which he refers to punctogallana, but it appears to pertain rather to nitens, which has a considerably more elongated spire than the former.

After examining considerable series of both I find they may be readily separated by the character of the columella, which is decidedly shorter in the present species, which, moreover, has the base more contracted, and the whorls more closely coiled Most of the specimens I have seen labelled ceylanica pertain to puncto-

gallana

380. Glessula nitens, Gray

Achatma mitens, Gray, Ann Philos x s ix, 1825, p 415, ibid, Spicil Zool 1830, p 5 (refers to plate 6 fig. 10, but plate not published), Pfeiffei, Mon Helic Viv u, 1848, p 260. Deshayes în Férussac, Hist Nat Moll 11, part 2, 1851, p 165, pl 134, figs 25-27, Pfeiffer, Conch-Cab, Bulimus, 1865, p 365, pl 43;

Oleanna (Electra) nitens, Adams, Gen Rec Moll 11, 1855, p 105. Achatma (Electra) mtens, Pfr Malak Blatt ni, 1856, p 168.

Hanley & Theobald, Conch Ind 1870, pl. 17, fig 1

Cionella (Glessula) nitens, von Martens, Die Heliceen, ed 2, 1860,

Glessula nitens, Nevill, Enum Helic Ceylon, 1871, p 3, Pfeisier & Clessin, Nomencl Helic Viv. 1881, p 331; Beddome, Proc Malac Soc. London, vii, 1906, p 165, Pilsbry, Man. Conch ser 2, xx, 1908, p 55, pl. 6, figs 1, 2

Stenogyna (Glessula) nitens, Nevill, Hand List, i, 1878, p 171

Original description .—" Testa ovato-comica, turrita, hyalina, cornea, lævi polita, apice obtusiuscula; anfractibus 8 convexis; apertura ovata, peristomate tenui

"Axis 7-10 [=17 75 mm], diam 3-10 unc [=75 mm]"

(Gray, 1825.) "Shell turreted, shining, pellucid, horn colour; spire conical; apex blunt; whorls 7-8, gradually enlarging, convex. Aperture the length of the shell, ovate Columella sharply curved "Axis \frac{5}{6}, diam. \frac{1}{4} of an inch." (Gray, 1830.)

Hab Coylon (Layard, H. Nevill), Kandy (G. Nevill)

G. miens has a broader base and a shorter columella than G panætha. A shell in the Beddome collection has 74 whorls and measures, length 155 mm, diameter 8 mm

In the Beddome collection I also found four shells labelled G. serena, but they are undoubtedly G nitens Their measurements

are as follows ---

7½ whorls, length 18 5 mm , diam. 8 5 mm 8 $\frac{1}{4}$,, ,, 20 5 mm , ,, 9 5 mm

The Cuming collection comprises some shells—no habitat recorded—which possess 7½ whorls and measure 18×7.5 mm.; they were labelled botellus by Beddome, but I do not accept this identification. Some shells, from Hinidun, presented to the British Museum by Mr. H. B. Preston, are pale corneous, these consist of 6 whorls and measure 11 5×55

381. Glessula fulgens, Pfeiffer.

Achatina fulgens, Pleisser, Malak Blätt v, 1858, p 238; ibid, P. Z S 1850, p 27, ibid, Mon Heli Viv vi, 1868, p 225
Glessula fulgens, Pseisser & Clessin, Nomencl Helic Viv 1881, p 330; Pilsbry, Man Conch ser 2, vv, 1909, p 101

Original description —"T oblongo-ovata, solidula, laevigata, pellucida, antida, corneo-fulva, spira ovato-conica, apice obtusula; aufr 6 convexiusculi, ad suturam anguste marginatam striatuli, ultimus 3 longitudinis subaequans, basi rotundatus, columella perarcuata, albo callosa, oblique sublate truncata, apertura verticalis, sinuato-elliptica; perist rectum, obtusum.

"Long. 121, diam 5? mill Ap 51 mill longa, 3 lata."

(Pfaffer.)

Hab Ceylon Hinidun (Preston)

This species, the habitat of which has hitherto remained



Fig 127 -Gleszula fulgent ?

unknown, is allied to G nitens. Never having been illustrated, I have thought it useful to add a figure of the type in the British Museum

The late E L Layard presented some shells to the British Museum, which consist of 61 whorls and measure 13.5×6.25 mm

382 Glessula panætha, Benson.

Achaima panætha, Benson, A M N H ser 3, v. 1860. p 384. Pfeiffer, Mon Helic Viv vi, 1868, p 226

Achatina (Electra) panætha, Hanley & Theobald, Conch Ind 1870. pl 36, fig 2

Glessula panætha. Nevill. Enum Helic Ceylon, 1871, p 3, Pfeiffer & Clessin, Nomenci Helic Viv 1881, p 330, Joussenume, Mani Soc Zool France, vii, 1894, p 264 (panætha), Beddome, Ploc Malac Soc London, vii, 1900, p 165

Stenogyn a (Glessula) panætha, Nevill, Hand List, 1, 1878, p 171

Original description - "Testa ovato-oblonga, tenui, obsolete striatula, nitidissima, pellucida, olivaceo-cornea, spira ad apicem obtusiuscula, lateribus convexiusculis, sutura valde impressa, vix marginata, cienulata, anfractibus $6\frac{1}{2}$ convexiusculis, superne prope suturam breviter convexis, ultimo $\frac{1}{3}$ longitudinis superante ad basın compressiusculo, apertura subventicali, subtriangularıovata, peristomate crassiusculo, obtuso, polito, albido, marginibus callo inconspicuo junctis, columellari arcuato, ad basin oblique truncato, intus plica obliqua spiraliter ascendente

"Long 13, diam 6 mill, apert 5 mill longa, 3 lata" (Benson) Hab Ceylon · Ellegamme Nalande, Matelle (Layard), Ceylon

(Nevrll)

This species approaches G nitens, but it has the last whorl wider and the aperture higher Some specimens in the Beddome collection are composed of 74 whorls and measure length 15 mm, diameter 6 25 mm

383. Glessula serena. Benson

Achatina sei ena, Benson, A. M. N. H. ser. 3, v. 1860, p. 384, Pfeiffer, Mon. Helic Viv. vi, 1868, p. 223
Glessula sei ena, Nevill, Enum. Helic Ceylon, 1871, p. 3, Pfeiffer

& Clessin, Nomenci Helic Viv 1881, p 330, Jousseaume, Mém Soc Zool France, vii, 1894, p 294, Beddome, Proc Malac Soc London, vii, 1906, p 166, Pilsbry, Man Conch ser 2, xx, 1908, p 59, pl 6, fig 9

Achatma (Electra) sevena, Hanley & Theobald, Conch Ind 1874,

pl 78. fig 8

Original description —"Testa ovato-pyramidata, solidiuscula, politissima, obsolete vix striatula, fulvo-cornea, pellucida, spira elongata, subturrita, apice subito obtusato, sutura impressa, submarginata, crenulata, anfractibus 61-7 subconvexis, superne prope suturam breviter convexis, ultimo ad basin via compresso, apertura verticali 3 longitudinis equante, subtriangulari-ovata peristomate recto obtusiusculo, margine columellari valde arcuato, albido-calloso, ad basin abrupte et oblique truncato

"Long 20-21, diam $9-9\frac{1}{2}$ mill; apert 9 mill. longa, $5\frac{1}{2}$ lata"

(Benson)

Hab Ceylon Akurambodie, South Matelle (Layard)

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The shells on which Benson based his species must have been immature, for I find specimens in the Beddome collection of 71 and 73 whorls; the former measuring 27 x 13 mm and the latter 27 x 12 mm A box in the same collection contained four specimens labelled "lankana=inornata," two of which pertain to the present species, while one is mornata and the other parabilis!

384 Glessula sinhila. Preston

Glessula sinhila. Preston, Rec. Indian Mus 111, 1909, p. 135, pl. 22, fig 14, Pilsbry, Man Conch ser 2, xx, 1910, p 320, pl. 43,

Original description -" Shell moderately thin, polished, dark yellowish horn colour, obtusely lanceolate, whorls 74, marked with very faint lines of growth only; sutures impressed, columella descending in a very oblique curve, peristome simple, bent slightly inwards above; aperture inversely, elongately auriform

"Alt 2175, diam major 9 mm, aperture, alt 775, diam. 4 mm." (Preston)

Hab Ceylon (Preston)

Mr Preston compares the present species with G inormata, Pfr., from which, he says, it is easily distinguished by its much more slender form Judging from the figure it appears to me to be much more pearly allied to G. serena, Benson It has, however, a less attenuated spire than the latter, and is a trifle more evlindrical in shape

385 Glessula layardı, Pilsbry.

Glessula layardı, Pılsbry, Man Conch ser 2, xx, 1908, p 59, pl 7, figs. 6, 7.

Original description -" The shell is oblong-turrite, yellowcorneous with profusely scattered whitish dots and spots (produced by disintegration of the surface), paler towards the summit Surface very glossy, without noticeable microscopic sculpture, but marked with unevenly spaced grooves, which are rather weaker on the last whorl, and obsolete on the base The summit is obtuse. rounded, first whorls smooth Whorls 62, moderately convex. Suture elegantly but somewhat irregularly denticulate Aperture vertical; outer lip obtuse; columella very short, moderately or deeply concave, subhorizontally and very deeply truncate

"Length 14, diam. 6, length of aperture 5 9 mm

"Length 135, diam 61, length of aperture 59 mm" (Pilsbry)

Hab. Ceylon (Layard)

"This species differs from G. ceylanica by its very much less deeply concave columella It is a smaller and more slender shell than G. serena which seems to be its nearest ally , The denticulation of the suture is a prominent feature Though 'live' shells, the surface is eroded in places The whitish flecks will probably not be found on shells from stations where they are less liable to erosion." (Pilsbru.)

A single specimen of Glessula layards, in the Beddome collection, was labelled G amentum; it consists of 7½ whorls and measures 165×7.5 mm., while a shell in my own collection has 7 whorls, its dimensions being . length 16, diam. 7 mm

386. Glessula deshayesi, Pfeiffer.

Achaima deshayesi, Pfeiffer, P Z S 1852, p 86; ibid, Mon. Helic. Viv 111, 1853, p 495, vi, 1868, p 226, ibid, Conch.-Cab, Bulimus, 1865, p 366, pl 43, figs 14-16, Hanley & Theobald, Conch. Ind 1875, pl 102, fig 2

Oleacina (Electia) deshayesi, Adams, Gen Rec Moll 11, 1855, p 105 Achatina (Electia) deshayesi, Pfeiffer, Malak Blatt 11, 1856, p 168. Cionella (Glessula) deshayesi, von Martens, Die Heliceen, ed. 2, 1860, p 254

Glessnia deshayesi, Nevill, Enum Helic Ceylon, 1871, p 3, Pfeiffer & Clessin, Nomencl Helic. Viv 1881, p 331, Jousseaume, Mém Soc Zool France, vii, 1894, p 291, Beddome, Proc Malac Soc London, vii, 1906, p 166, Pilsbry, Man Conch ser. 2, xx, 1908, p 57, pl 6, figs. 6, 12, 13

Original description — "A testa turrito-ovata, tenuiuscula, sublævigata, nitida, corneo-fusca; spira elongata, convexa, apice obtusula; sutura simplice, subprofunda; antractibus 7 convexis, ultimo \(\frac{2}{5}\) longitudinis subæquante, basi rotundato, columella subtorta, late et oblique truncata; apertura vix obliqua, rhombeo-semiovali; peristomate simplice, obtuso, margine dextro subrepando

"Long. 11, diam 5 mill " (Pfeiffer.)

Hab. Ceylon · Point Pedro (Layard) India: Koondah

Mountains, Calicut (Pfeiffer)

Pilsbry notes "smaller than G. nitens, and of a richer brown colour, but otherwise it is closely related. The whoris are strongly convex and the surface is very brilliant. Some of the post-embryonic whorls are rather distinctly striate. The suture is much less distinctly crenulate than in G nitens, nearly simple. The sides of the spire are slightly convex."

The British Museum possesses three specimens, received from E L Layard, from Pt Pedro, in the extreme north of Ceylon; these have seven whorls and measure 12×6 mm. There are also some specimens in the Cuming collection bearing Pfeiffer's own label; they are from Koondah, Calicut. The base is rather narrow and the shells are of a paler colour than the typical form; they are also composed of seven whorls but, like the type, only measure 11×5 mm.

387 Glessula pachycheila, Benson.

Achatına pachycheila, Benson, A. M. N. H. ser 2, xii, 1853, p. 94, Adams, Gen. Rec. Moll. 11, 1855, p. 132; Pfeisfer, Mon. Helic. Viv. 1v, 1859, p. 608

Achatina (Electra) pachycheila, Pleiffer, Malak Blätt ii, 1856,

p 168

Giessula pachycheila, Nevill, Enum Helic Ceylon, 1871, p 3, Pfeiffer & Clessin, Nomencl Helic. Viv 1881, p 331, Jousseaume, Mém Soc Zool. France, vii, 1894, p 295, Beddome, Proc Malac Soc London, vii, 1906, p 166, Pilsbry, Man Conch ser 2, xx, 1908, p 58

Stenogyra (Glessula) pachycheila, Nevill, Hand List, 1, 1878, p 172

Original description — "Testa ovato-oblonga striatula, striis exilissimis confertis, obsoletis, spiraliter sub-lente decussata, nitida fuscescente-cornea, translucente, spira elongata, subconica, apice obtuso, sutura leviter impressa, anfractibus 6, vix convexiusculis, ultimo \(\frac{2}{3}\) longitudinis vix æquante; apertura verticali, oblongo-ovata, peristomate intus albido-marginata, columella præarcuata, margine basali incrassato

"Axis 11. diam 5 mill" (Benson.)
Hab Ceylon Heneratgodde (Layard)

"This little species of a group, which has so many representatives in Ceylon, the Nilgherries, and the damp woody mountains of North-eastern India, with a more slender form than A oreas, Nobis, is well distinguished from the allied forms by its peculiar sculpture under the lens, and by the internal incrassation of the peristome, a feature which is also observable in the species A crassilabies, Nobis, from North-eastern India" (Benson)

Beddome states that this species and G deshayes, Pfr, are closely allied, and often confused in collections, but G pachycheila

is a narrower shell than the latter.

Val. taprobanica, Pilsbry (subspecies) l c p 58, pl 7, fig 16

"Shell smaller, very pale yellow. Sculpture of fine vertical grooves; close on the spire but rather widely, unevenly spaced on the last two whorls, no perceptible spiral lines; two whorls at the summit smooth Aperture small, the outer lip rather thick, columella moderately concave, subvertically and not very deeply truncate at the base

"Length 85 to 88, diam 32, aperture 3 mm, whorls $6\frac{1}{2}$ "

(Pilsbry)

Hab. Ceylon Kandookerre (Layard)

388 Glessula pyramis, Benson

Achatina pyramis, Benson, A. M. N. H. ser. 3, v, 1860, p. 463, Pfeiffer, Mon. Helic. Viv. vi, 1868, p. 226

Achatina (Electra) pyramis, Hanley & Theobald, Conch. Ind. 1870, pl. 18, fig. 6

Glessula pypamis, Godwin-Austen, J A S B xliv, 1875, p 3, Nevill, J A S B xlvi, 1877, p 26, Nevill in Anderson, Zool Res Exp W Yunnan, 1, 1878, Moll p 886, Pfeiffer & Clessin, Nomenci Helic. Viv 1881, p 331, Beddome, Proc Malac Soc London, vii, 1906, p 166, Pilsbiy, Man Conch ser 2, xx, 1909, p 92, pl 12, fig. 1

Stenogyra (Glessula) pyramis, Nevill, Hand List, 1, 1878, p 169.

var major. Nevill. op cit p 169

Original description ·—"Testa oblongo-turrita, solidula, lævigata, striatula, nitida, luteo-cornea, spira turrita, lateribus convexiusculis, apice obtusiusculo, sutura impressa, anfractibus 8, convexausculis, ultimo 1 testæ æquante, antice obsolete plicato, apertura subverticali, elliptico-semiovali, columella arcuata, callosa, basi oblique truncata, peristomate recto obtuso, intus albido-labiato

"Long 15. diam. 6 mill.: apert. 5 mill. longa, 21 lata"

(Benson)

Hab India Teria Ghat, Khasi Hills (Theobald, Godwin-Austen)

Val. major, China · Ponsee, Yunnan (Anderson)

This species resembles G. bensoniana in shape and general appearance, but although a much smaller shell it has the same number of whorls, which are more closely coiled

The shell is distantly and irregularly ribbed There are four specimens in the Theobald collection in the British Museum. from the Khasi Hills, consisting of 81 whorls, and measuring 14×6 mm.

389 Glessula leptospira. Benson.

Achatma leptospura, Benson, A M N H ser 3, xv, 1865, p 14,

Pfeiffer, Mon Helic. Viv vi, 1868, p 233

Achatina (Electra) leptospira, Hanley & Theobald, Conch Ind. 1870, pl 35, fig 2

Stenogyra (Glessula) leptospu a, Nevill, Hand List, 1, 1878, p 171 Stenogyra (Subulina) leptospira, Pfeiffer & Clessin, Nomencl. Helic

Viv 1881, p 326

Glessula leptospu a, Beddome, Proc Malac Soc London, vii, 1906, p 166, Pilsbry, Man Conch sei 2, xx 1909, p 65, pl 12, fig 2

Original description - "A. testa oblongo-turrita, striatula, nitente, pallide fusco-cornea, spira subanguste turrita, apice obtuso, sutura profundiuscula, crenulata; anfractibus 9, convexiusculis, superioribus brevibus convexioribus, ultimo 1 longitudinis non æquante, apertura subobliqua, elliptica, marginibus callo junctis, columellari arcuato, oblique truncato, dextro tenui.

"Long 16, lat 6 mill" (Benson)

Hab India Soomeysur Hills (Theobâld)

390 Glessula sisparica, sp. n.

Shell clongate-conoid, translucent, pale fuscous, finely and densely costulate-striate, the strim slightly flexuous close to the suture Spire narrow, with straight sides, suture rather deep, GLESSULA 411

aper acute Whorls 9, a little conver, slightly gibbous at the upper suture, the last whoil equalling in width ? of the entire length of the shell Aperture slightly oblique, pyriform, peristome with acute margins, the callus on the parietal wall scarcely



Fig 128 - Glessula sisparica

perceptible; upper margin scarcely curved and nearly vertical, basal margin deeply curved, columella slightly arcuate, fruncate.

Length 1775, diam. 575 mm, apert height 55, width 3 mm Hab India. Sispara, Nilgiris (Beddome)

Type in the British Museum

This new species differs from G tenutesta in having an acute apex, a deeper suture, in the whorls being gibbons at the upper suture, in the last whorl being more sloping behind the columella, and lastly in being distinctly costulate-striate. From G leptospira it may be separated by the straight sides of the spire, the acute apex, and the narrower base. One specimen possesses 91 whorls, and measures 18 25×6 mm. Two of the earlier whorls appear to have been fractured at an early stage, so that the shell has the spire slightly tilted.

391 Glessula tenustesta, sp n

Shell elongate-conoid, pale corneous, thin, translucent, polished, shining, densely covered with minute impressed lines. Spire slightly convex; suture shallow, apex obtuse. Whorls 83, slightly convex, increasing rather rapidly, the last whorl equalling in width



Fig 129 — Glessula tenuitesta

nearly 3 of the entire length of the shell, tumid below behind the columella. Aperture a little oblique, broadly oborate, peristome with acute margins, connected by a thin callus on the parietal wall, outer margin slightly curved, basal margin arcuate; columella deeply arcuate, obliquely truncate

Length 18, diam 6 mm, apert height 5, width 3 mm

Hab India Sispara, Nilgiris (Beddome)

Type in the British Museum.

Two specimens, labelled G. bensoniana, were found in the Beddome collection, but they differ from that species in having a convex spire, a narrower base and smaller aperture, while the whorls are more narrowly coiled. The new species is allied to G. leptospua but it is thinner in texture, smoother and more glossy, and not struted, the whorls are less convex and the last whorl is wider. From the next species it may be separated by the convex spire, the more obtuse apex, the smaller number of whorls which increase more slowly, and the more tunid last The second specimen is composed of only 8 whorls and measures 13.5×5 mm

392. Glessula notigena, Benson

Achatina notigena, Benson, A. M. N. H. sei 3, v. 1860, p. 462; Pfeiffer, Mon Helic Viv vi, 1868, p 229

Achatina (Electra) notigena, Hanley & Theobald, Conch Ind 1870.

pl 35, figs 8, 9

Stenogyia (Glessula) notigera, as of Blanford, Nevill, Hand List, 1,

1878, p 167

Glessula notigena, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 331, Beddome, Proc Malac Soc London, vn, 1906, p 166, Pilsbry, Man Conch ser 2, xx, 1909, p 66, pl 12, figs 3, 4, 9

Original description - "Testa elongato-conica, superne attenuata, tenui, subcostulato-striata, tulvo-cornea, nitida, pellucida; spira turrita, superne attenuata, apice obtuso, sutura impressa, irregulariter crenulata; anfractibus 9-10 convexiusculis, ultimo 1 testæ non attingente, apertura subverticali, anguste semiovali, columella vix arcuata, subverticali, basi suboblique truncata, peristomate recto, tenui, marginibus callo tenui junctis.

"Long 20, diam. 7 mill., apert 6 mill longa, vix 4 lata"

(Benson.)

Mahableshwar Hills (Chesson), Poona and Khandala (Blanford, Fau bank), nr Bombay (Theobald); Sikkim.

Dangeeling (Beddome).

Three specimens in the Theobald collection from Mahableshwar, measure 235×7 mm. Four shells from Darjeeling, in the Beddome collection, were labelled tenuspira, but I refer these to notigena; they measure. length 35, diam 7.5 mm

393. Glessula sarissa, Benson.

Achatina sarissa, Benson, A M N H ser 3, v, 1860, p 463;

Pfeiffer, Mon Helic Viv vi, 1868, p 234

Achatina (Electra) sarissa, Hanley & Theobald, Conch Ind 1870,

pl 35, fig 10.

Stenogyra (Glessula) sarussa, Nevill, Hand List, 1, 1878, p 170 Stenogyra (Subulina) sarussa, Pfeiffer & Clessin, Nomenci Helic. Viv 1881, p 326

Glessula sarussa, Beddome, Proc Malac Soc. London, vn., 1906, p 167, Pilsbry, Man Conch ser 2, xx, 1909, p 93, pl 12, fig 11.

Original description :- "Testa elongato-conica, tenui, lævigata,

striatula, anfractibus ultimis sub lente confertim obsolete decussatis, nitidissima, olivaceo-cornea, spira elongato-pyramidata, apice obtuso, sutura impressa, anfractibus 9½ convexiusculis, ultimo ¾ testæ superante; apertura subverticali, ovato-elliptica, columella obliqua, leviter arcuata, albido calloso, basi oblique truncata, peristomate recto, tenui.

"Long 16, diam. 51 mill., apert. 5 mill longa, 31 lata"

(Benson.)

Hab. India Comercolly, Banks of Ganges, Bengal (Cantor); Oolooberiah, Moisraka, and Jessore District (Nevill), Bombay

Ghats (Beddome)

The figure in Conch Ind has considerably larger dimensions, i. c. 21 × 8-25 mm, than those indicated by Benson, and it is, therefore, doubtful if the shell represented is identical with Benson's species. I have not seen specimens

394. Glessula vernina. Benson.

Achatma ceruma, Benson, A. M. N. H. ser 2, xn, 1853, p. 94.
Adams, Gen. Rec. Moll. H., 1855, p. 132, Pfeiffer, Mon. Helic.
Viv. 1v, 1859, p. 615

Achatina (Subulina) veruina, Pfeiffer, Malak Blätt, 11, 1856, p 169 Stenogyra (Glessula) veruina, Nevill, Hand Last, 1, 1878, p 171 Stenogyra (Subulina) veruina, Pfeiffer & Clessin, Nomencl Helic

Viv 1881, p 327

Glessula reruma, Nevill, Enum Helic Ceylon, 1871, p 3, Jousseaume, Mém Soc Zool. France, vn, 1894, p 295, Beddome, Proc. Malac Soc. London, vii, 1906, p 167, Pilsbry, Man Conch ser 2, xx, 1903, p 60

Original description —"Testa cylindraceo-turrita, valde elongata, sordide albida, inæqualiter striata, spira superne sensim attenuata, sutura impressa, crenulata, apice obtuso; anfractibus 12½-13 augustis cylindricis, ultimo ½ longitudinis vix æquante; apertura verticali, truncato-orali, peristomate recto, acuto, margine columellari leviter arcuato

"Long 25, diam 5 mill" (Benson.)
Hab Ceylon Nalande (Layard)



Fig 130 —Glessula veruina 🚦

I have only seen a single specimen, which is in the Theobald collection, in the British Museum. It is composed of only nine whorls and measures 19×4 mm, but it agrees with the

description. As the species has never been illustrated I have thought it advisable to give a figure of this specimen

The type, unfortunately, appears to have been lost, as it cannot

be found in the McAndrew collection at Cambridge.

395. Glessula hastula, Benson.

Achatina hastula, Benson, A. M. N. H. ser. 3, v. 1860, p. 461.

Pfeiffer, Mon Helic Viv vi, 1868, p 285

Achatina (Electia) hastula, Hanley & Theobald, Conch Ind 1870. pl 18, fig 4.

Stenogyi a (Glessula) hastula, Nevill, Hand List, 1, 1878, p 169 Stenogyra (Subulina) hastulu, Pfeiffer & Clessin, Nomencl Helic. Viv 1881, p 327

Glessula hastula, Theobald & Stoliczka, J A S B xli, 1872, p 334, Beddome, Proc Malac Soc London, vn, 1906, p 167, Pilsbry, Man Conch ser. 2, ax, 1909, p 93, pl 12, fig 12

Original description .- "Testa turrito-subulata, tenui, oblique capillaceo-striata, fusco-cornea, nitidula; spira subulata, apice obtuso, sutura piofundiuscula, aufractibus 9, primis convexis. postremis convexiusculis, ultimo ? teste vix attingente, apertura vix obliqua, ovato-elliptica, peristomatis marginibus callo tenui junctis, dextrali recto acuto, columellari arcuato calloso albido. basi oblique truncata

'Long 12½, diam. 3½ mill; long apert. 3½ mill" (Benson) Hab India Pankabari near Darjeeling (Blanford). Burma Kumah Hill and Mai-1, Saudoway District, Arakan (Theobald & Stoliczka)

396 Glessula corrosula, Pfeiffer.

Achalma corrosula, Pf. iffer, P. Z. S 1856, p 35, abid, Novit. Conch sei 1, 1, 1858, p 104, pl 29, figs 9, 10, ibid., Mon Helic Viv iv, 1859, p 612

Achatma (Electra) corrosula, Hanley & Theobald, Conch Ind 1870.

pl 18, fig 2 Stenogyra (Glessula) corrosula, Nevill, Hand List, 1, 1878, p 167 Stenogyr a (Subulma) corrosula, Pfeiffer & Clessin, Nomencl Helic. Viv 1881, p 326

Glessula corrosula, Beddome, Proc Malac Soc London, vii, 1906, p 167, Pilsbry, Man Conch. ser 2, xx, 1909, p. 67, pl 12, ngs 5, 6

Original description - "A testa turnita, solidula, sublævigata, punctatim corrosula, pallide cornea, spira convexiusculo-turrita, apice acutiuscula, sutura levi, subcrenulata, anfr 9 vix convex-iusculis, ultimo 3 longitudinis vix æquante, basi rotundato; columella perarcuata, oblique distincte truncata, apertura parum obliqua, sinuato-semiovali, perist. simplice, tenui

"Long 15, diam. 61 mill" (Pferffer)

Hab. India Nilgiris (Shiplay, Blanford), Kuinool (Stoliczka). Three specimens in the Cuming collection, from the Nilgiris, measure 14.5×4 mm

415

397 Glessula blanda, sp. n.

Shell elongate-conoid, opaque, rather thin, pale yellow, glossy, very finely striated. Spire narrow, scarcely convex; suture shallow, marginate: apex a little obtuse. Whorls S₄, flattened, increasing slowly at first, the last four rather suddenly, the last whorl equalling in width nearly \(\frac{1}{3} \) of the entire length of the shell. Aperture oblique, narrowly obovate, the margins united by a thin callus on the parietal wall peristome with acute margins, outer margin scarcely curved, basal margin deeply curved, columella arcuate, obliquely truncate.

Length 155, diam 5 mm, apert, height 5, width 25 mm



Fig 131 -Glessula blanda

Hab India Anamullays (Beddome) Type in the British Museum.

Several specimens without name in the Beddoine collection were found to pertain to an undescribed form. The new species somewhat resembles a miniature G benson and, but the outline is a little more cylindrical, the spire is a little more convex, the apex a little more obtuse, the base narrower, while the shell is more glossy and the strice are much finer

A single specimen occurs with narrower base and with more convex whorls. Some of the shells are of a very pale yellow, almost approaching white, while several are dark fuscous, and others again pale fuscous and very translucent.

398. Glessula bensomana, Pfeiffer.

Achatma bensomana, Pfeisser, Zeits Malak, vin, 1851, p 27; ibid., Mon Helic Viv in, 1853, p 494; ibid., Conch-Cab, Bulimus, 1860, p 325, pl 26, figs. 12, 13

Oleacina (Electra) bensoniana, Adams, Gen Rec Moll 11, 1855, p 105

Achatma (Electra) bensomana, Pfeisser, Malak Blätt. ii, 1856, p 168

Stenogyra (Glessula) bersoniana, Nevill, Hand Last, i, 1878, p 167, ibid., J A S B i, 1881, p 137, pl 5, fig 16
Glessula bensoniana, Pfeiser & Glessin, Nomenci Helic. Viv 1881,

Glessula bensoniana, Pfeisfer & Clessin, Nomenci Helic. Viv 1881, p 330, Jousseaume, Mém. Soc. Zool. France, vii, 1894, p 293; Beddome, Proc Malac Soc London, vii, 1906, p 167, Pilsbry, Man Conch, ser 2, xx, 1909, p 67, pl 12, figs 13, 14

Original description:—"T oblongo-subulata, tenuis, vix striatula, nitida, subpellucida, fulvo-cornea; spira subturrita, apice

obtususcula, sutura subimpressa, confertim denticulata, anfr. 8½ planiusculi, ultimus ⅓ longitudinis paulo superans, basi attenuatus, columella leviter aicuata, paulo supra basin aperturæ subsemiovalis bieviter truncata; perist. simplex, acutum, margine dextro leviter arcuato

"Long 18, diam 63 mill" (Pfeiffer.)

Hab India: Nilgiris (Periottet); Anamullays (Beddome), Kota-

gherry and Ootacamund (Stoliczka)

Jousseaume attributes this species to Ceylon, quoting Benson as his authority, but, as I have been 'mable to trace any statement to that effect by Benson, the only possible explanation appears to be that Jousseaume must have confused the species with some other

The British Museum contains three specimens from Vizagapatam, which were labelled botellus by Beddome, but which are undoubtedly forms of bensoniana They have eight whorls, two shells measuring 18.5×8 mm, and the third 18×8.5 mm.

399 Glessula tinnevellica, sp. n.

Shell elongate-conoid, rather solid, more or less opaque, polished, finely costulate-striate, the strix crossed by excessively fine close spirals, which are more prominent and distinctly incised at the base near the parietal callus. Spire narrow with straight sides, suture superficial, crenulate, apex acute, prominent Whorls 8½, increasing slowly and regularly, the earlier ones flattened, fulvous



Fig. 132 —Glessula tunnevelluca 3

corneous, the later ones slightly convex, dark chestnut with a pale subsutural narrow band, last whorl equalling in width \(\frac{1}{3} \) the entire length of the shell. Aperture oblique, narrowly obliquely pyriform, peristome with acute margins, united by a thin callus on the parietal wall, outer margin descending nearly vertically, basal margin slightly curved, obliquely descending, columellar margin slightly curved elongate.

Length 18, diam. 7 mm.; apert. height 7, width 3 mm.

Hab India Tinnevelly (Beddome).

Three specimens in the Beddome collection (British Museum), labelled G anamullica, proved quite distinct upon examination, being in fact nearer G. bensomana but differing from the latter in

having a narrower base and more acute apex, a more slender spire, more closely coiled whorls and a subangular periphery. A second specimen has the aperture a little higher and is fuscous above the periphery, dark chestnut below it. A third specimen is greenish corneous, with a yellowish subsutural band, which widens at the penultimate and reaches the periphery on the last whorl

400 Glessula travancorica, sp. n.

Shell elongate-conoid, thin, translucent, fuscous corneous, glossy, very finely and rather regularly striated, the strike flexuous near the upper suture, while under a strong lens very dense spiral sculpture may be detected. Spire narrow, with straight sides; suture impressed, margined; apex acute, prominent. Whorls 8½, slightly convex, increasing slowly and regularly at first, the last three rather suddenly, the last whorl equalling in width ¾ of the entire length of the shell. Aperture oblique, semi-ovate, peristome acute, the margins united by a thin callus on the parietal



Fig 133 - Glessula travancorica

wall: outer margin slightly curved, basal margin arcuate; columella slightly curved, obliquely truncate

Length 14, diam. 475 mm; apert height 45, width 2 mm

Hab. India Peermede, Travancore (Beddome) Type in the
British Museum

This new species resembles a miniature G tinnevellica, but apart from its much smaller size, the whorls are more convex and more closely coiled, and the last whorl is less turned. It is also thinner and more translucent. Only four specimens were found in the Beddome collection, two of which are a trifle more conoid than the type, measuring 12×5 mm and 115×475 mm respectively.

401. Glessula jeyporensis, Beddome

Glessula jeyporensis, Beddome, Proc Malac Soc London, vii, 1906, p 167, pl 15, hg 6.

Glessula subserena, Pilsbry (non Beddome), Man Conch ser 2, xx, 1909, p 75, pl 8, fige 11, 12

Original description .— "Testa oblongo-turrita, tenuis, striatula, nitida, luteo-cornea, spira subturrita, ad apicem obtusa; sutura

impressa, crenulata, anfractus 8 subplaniusculi, ultimus \(\frac{2}{5} \) longitudinis feie æquans; columella valde arcuata, ad basim truncata; apertura semi-ovalis, peristoma simplex.

"Long 18, diam. 6 mm; aperture 5 mm. longa, 3 lata." (Bed-

dome)

Hab. India · Jeypore Hills.

Said to be "allied to bensoniana, but with a shorter, blunter spire" An examination of the type in the British Museum has convinced me that jeyporensis bears no resemblance to bensoniana, which is a many-whoiled species. It is very nearly related to jerdoni, but is a little more shining and the whorls are somewhat shouldered near the upper suture. It appears to me, however, to be a doubtful species. Five shells in the Beddome collection, from the type locality, have a somewhat broader base than the type, measuring 17.5×7 mm (7½ whorls).

402 Glessula jerdoni, Reeve

Achatina jerdoni (Benson), Reeve, Conch Icon v, 1850, Achatina, pl 21, ing 80, Pfeisfer, Mon Helic Viv III, 1853, p 494, ibid, Conch-Cab, Bulimus, 1860, p 312, pl 25, figs. 10, 11

Oleacina (Electra) jerdoni, Adams, Gen Rec Moll II, 1855, p 105

Achatina (Electra) jerdoni, Pfeisfer, Malak Blatt II, 1856, p 168, Hanley & Theobald, Conch Ind 1874, pl 78, fig 10

Stenogyra (Glessula) jerdoni, Nevill, Hand List, 1, 1878, p 168; ibid, J A S B 1, 1881, p 136, pl 5, fig 14

Glessula jerdoni, Pfeisfer & Clessin, Nomencl Helic Viv 1881, p 330, Beddome, Proc Malac Soc London, vii, 1906, p 168; Pilsbry, Man Conch ser 2, vx, 1909, p 75, pl 12, figs 16-18

Original description.—"Shell somewhat pyramidally oblong, whoils seven to eight ... number, convex, smooth polished, finely margined at the sutures, columella arched, conspicuously truncated, aperture small, brown horny." (Reeve)

The following dimensions are given by Pfeiffer (Mon. Helic. Viv iii, p 495). "Long 14, diam 5 mill Ap 4\frac{2}{3} mill longa,

medio 23 lata," from Bensonian specimens

Hab India · Nilgiris (Jerdon, Blanford, Nevill), Pulney Hills (Fairbank), Anamullays and Cherra Poonice (Beddome)

403 Glessula singhurensis, Blanford.

Glessula singhuiensis, Blanford, J A S B XXXIX, 1870, p 19, pl 3, fig 17, Pfeiffer & Clessin, Nomencl Helic Viv. 1881, p 330, Beddome, Proc Malac Soc London, vii, 1906, p 168, Pilsbry, Man Conch ser 2, xx, 1909, p 76, pl 10, fig 5

Achatina (Electia) filosa, Hanley & Theobald, Conch Ind 1874, pl 78, fig 7.

419

Achatina singlurensis, Pfeister, Mon. Helic, Viv vin. 1877. Stenogyra (Glesula) singhurensis, Nevill, Hand List, 1, 1878. p ÍČG

GLESSULA.

Original description -"Testa pyramidali, turrita, tenuis, cornea. polita, nitida, levis, viz striatula; spira elongato conica; apice sub-acuto: sutura impressa, minute corrugata. Anfr. 8 convexi. ultimus I longitudinis vix aquans, subtus rotundatus. Apertura fere verticalis, ovato-oblonga; peristoma obtusum, albescens; columella valde arcuata, antice oblique truncata.

"Long. 121, diam 44, ap long. 4, lat 21 mm" (Blanford.)

Hab India Singhur near Poons (Blanford)

"This is allied to the Nilgiri G jerdom, Bens, but the sides of the spire are less convex, the shell being more regularly pyramidal with a less obtuse apex. In some of the specimens of this species collected alive, but in which the animal had subsequently dried up. I found young shells It would thus appear to be in marous. I have observed the same circumstance (the ocurrence of young inside the old one) in G cassiaca, Bs In other species of this genus I have found small round eggs with a calcareous shell, but these may be hatched, before they are deposited by the parent." (Blanford)

The Cuming collection in the British Museum comprises five specimens from the type locality, which measure 12×45 mm. I possess shells from Poons, received from the late Colonel Beddome, which are a little darker in colour than the type and

have the apex a little more acute

G singhurensis is allied to G. naja, Pilsbry, but it is smaller and has the last whorl proportionately higher

404 Glessula amentum, Recie.

Achatina amentum (Benson), Reeve, Conch Icon v, 1849, Achatina, pl 17, fiz 82 Pfeiffer, Mon Helic Viv in 1853, p 499, ibid, Conch-Cab, Bulimus, 1860, p 311, pl 25, fig: 4, 5, Benson, A M N H ser 3, v, 1860, p 464

Oleacina (Llectra) amentum, Adams, Gen Rec. Moll 11, 1855.

p 105

Achatina (Electra) amentum, Pfeisser, Malak Blätt, 1, 1856, p 168; Hanley & Theobald, Conch Ind 1870, pl. 35, fig 3

Cionella (Glessula) amentum, von Martens, Die Heliceen, ed. 2. 1860, p 254

Stenogyra (Glessula) amentum, Nevill, Hand List, 1, 1878, p 169;

ibid, J A S B l, 1881, p 138, pl 5, hg 10

Glessula amentum, Pfeiffer & Clessin, Nomencl Helic, Viv 1881, p 331 - Beddome, Proc. Malac. Soc. London, vii, 1906, p 168; Pilsbry, Man Conch ser 2, xx, 1909, p 77, pl 10, figs 1-4

Original description - "Shell cylindrically turreted, very thin. whorls nine in number, rounded, obscurely very finely plicately

structed. columella arched and twisted attenuately truncated:

transparent horny." (Reeve.)

Pfeiffer supplies the following measurements from specimens sent to him by Benson (Mon Helic Viv. in, p 499). "Long. 22. diam. 7 mill. Ap. oblique 71 mill longa, medio 4 lata"

Hab. India. Howrah near Calcutta (Reeve, Benson), Gantam

(Ball, Beddome); Orissa (Beddome)

"I found the smaller variety very abundant on the top of Myhendra Hill (Ganjam) The larger variety, found near Calcutta and in Central India, and well figered by Hauley, is a It has a shorter and blunter apex and fewer whorls than vadalica, but specimens of that species sometimes do duty for it in collections." (Beddome.)

The "smaller variety," referred to by Beddome, is quite a dis-

tinct form on which I have based the next species

405. Glessula ganjamensis, sp n.

Shell cylindrico-conoid, opaque, rather solid, a little shining, finely and closely striated under a greenish or yellowish deciduous cuticle, the strie slightly flexuous near the upper suture. convex; suture impressed, crenulate, apex obtuse slightly convex and somewhat gibbous at the upper suture, the last whorl equalling in width about 1 of the entire length of, the shell. Aperture nearly vertical, sub-ovate; peristome a little thickened, parietal callus scarcely perceptible; outer margin slightly curved, basal margin deeply curved, columella deeply arcuate, obliquely truncate.

Length 16 25, diam. 7 mm., apert. height 6, width 35 mm



Fig 134 - Glessula ganzamensis

Hub. India: Myhendra Hill, Ganjam (Beddome)

Type in the British Museum.

This is the form referred to by Beddome as "the smaller variety [of G amentum] very abundant on the top of Myhendra Hill." It is, however, quite distinct from G. amentum, being not only considerably smaller but more solid, with a more convex spire, a less obtuse apex, a more turned and relatively higher last whorl, and a narrower sperture. The cuticle appears to be rather deciduous and many specimens have the apex corroded One specimen with 8 whorls measures 17 mm. in length. Another shell, composed of 71 whorls, only attains 14 75 mm in length with a diameter of 5 25 mm.

406 Glessula facula, Benson.

Achalina perrolleli, Reeve, Conch. Icon. v, 1850, Achalina, pl. 21, ing. 102 (non. Pfr.)

Achalina facula, Benson, A. M. N. H. ser. 3, v, 1800, p 406,

Pfeiffer, Mon Helic. Viv vi, 1868, p 224

Achatma (Electra) facula, Hanley & Theobald, Conch. Ind. 1870, pl. 35, fig. 1
Stenogyra (Glessula) facula, Nevill, J. A. S. B. 1, 1881, p. 137,

pl 5. fg 18

Glessula facula, Pfeiffer & Clessin, Nomenci Helic. Viv. 1881, p 330, Beddome, Proc Malac Soc London, vii, 1906, p 168; Pilsbry, Man. Conch ser 2, xx, 1909, p 77, pl 10, figs 8, 9

Original description — "Testa turrito-ovata, tenui, lævigata, irregulariter strictula, translucente, nitida, pallide fulvo-cornea; spira turrito-conica, apice obtuso, sutura profundiuscula, irregulariter vix crenulata; anfractibus 71, subconvexis, ultima 3 testæ vix attingente, antice leviter remote plicato-striato; apertura subverticali, semiovali, columella breviter valde arcuata, callosa, basi oblique trancata, peristomate recto, tenui, marginibus callo tenui junctis.

"Long 18, diam 8 mill, apert 7 mill. longa, 4½ lata" (Benson)

Hab India Nilgiri Hills (Jerdon'; Pulney Hills (Nevill);

Kurnool, Anamuliay Hills, and Jeypore Hills (Beddome)

407 Glessula illustris, Godwin-Austen.

Glessula illustris, Godwir-Austen, J. A.S. B. xliv, 1875, p. 3, pl. 1, fig. 5, ibid, xlv, 1876, p. 315, Pfeiffer & Clessin, Nomenck. Helic Viv. 1881, p. 330; Beddome, Proc. Malac Soc. London, vii, 1906, p. 168, Pilsbry, Man. Conch. ser. 2, xx, 1909, p. 95, pl. 11, figs. 13-16

Achatina illustris, Hanley & Theobald, Conch Ind. 1875, pl 102,

fig 9, Pfeiffer, Mon. Helic. Viv viu, 1877, p 279.

Stenogyra (Glessula) illustris, Nevill, Hand List, 1, 1878, p 170.

Original description —"Shell elongately oval, greenish horny, finely stricted longitudinally; whorls 7, very slightly rounded, suture moderately impressed, the lip thickened, columellar margin slightly curved and strong, apex blunt.

"Length 075 [=19 mm], major dam 03 [=75 mm];

length of aperture 03 inch [=75 mm]." (Godwin-Austen)

Hab India Hengdan Penk, N Cachar Hills, 7000 ft; Nenglo, 6000 ft, Luka Valley, Jaintia Hills, 1000 ft. (Godwin-Austen)

"This species is an elongate and larger form of Glessula crassilabris, of which G pyramis is a closer variety, but its much more elongate form and stronger striction make it a good connecting species with G. Lutleri described further on The form from the Luke Valley is a turned departure from the type figured. One specimen measures. alt 0.75 [=19 mm], major diam 0.38 inch [=9.25 mm], another 0.65 [=16.25 mm], major diam 0.35 inch [=9 mm]

"I look on all these species as properly varieties, and G ciassilabits, very abundant in all the grass country of the Khasi Hills, may be taken as the type; a difference in elevation and conditions of habitat, from damp dark forest to hot grassy slopes, having

produced modifications of form "

Pilsbry points out that in G. illustris the embryonic whoils are closely and finely striate vertically as in G notigena and that hence it has no affinity to G. crassilabris. He continues "It is a much less robust shell and less polished, and on the last whorl there are traces of fine spiral striction, as shown in fig. 13. The sculpture of the later whorls is irregular; there seem to be unequally separated grooves, with finer strice and grooves in the intervals, but quite unequally developed. The suture is crenulate. On the last whoil or two some traces of spiral strice appear in places. The outer lip is a little sinuous, being retracted above, it is moderately thickened of obtuse"

Beddome was unable to distinguish this species in any way from G. facula, but the latter has the whorls much more closely coiled.

A specimen from N Cachai, in the Beddome collection, composed of seven whorls, measures only 16 mm. in length and 7 mm in diameter.

408. Glessula botellus, -Benson.

Achatina botellus, Benson, A M N H ser 3, v, 1860, p 465, Pfeiffei, Mon Helic Viv vi, 1868, p 226
Achatina (Electra) botellus, Hanley & Theobald, Conch Ind 1870, pl 35, fig 4
Stenogyru (Glessula) botellus, Nevill, Hand List, 1, 1878, p 168
Glessula botellus, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 331, Beddome, Proc Malac Soc London, vii, 1906, p 168, Pilsbry, Man Conch ser 2, vv, 1909, p 78, pl. 10, fig 6

Original description —""Testa oblonga, solidiuscula, lævigata, leviter striatula, sub lente indistincte confeitim, spiraliter, minutissime acuducta, polita, fulvo-castanea, spira ovato-oblonga, apice valde obtuso, sutura impressa, leviter crenulata anfractibus 7 convexiusculis, ultimo vix latiore, apertura subobliqua, semiovali, intus albida, columella valde aicuata, albido-callosa, basi subverticaliter truncata, peristomate i ecto, marginibus callo tenui junctis, dextrali latiusculo, planato, non incrassato" (Benson)

Long 18, diam. $7\frac{1}{2}$ mill.; apert 7 mill longa, $3\frac{2}{3}$ lata Hab India, Nilgiri Hills (Jerdon); Pykaia, Nilgiris (Blanford) This species is characterized by the flattened whorls and

shallow suture. It resembles G. subperrotteti, but is more polished, the suture is not inargined, and the base is narrower

Some specimens from the Nilgiris in the Beddome collection were labelled G facilia, but I refer them without hesitation to G. botellus, one composed of 7½ whorls, measures 195×8 mm Three shells from Pegu, in the Theobald collection, are composed of seven whorls, and measure 16×7 mm

409 Glessula orophila, Reeve

Achalina orophila (Benson), Reeve, Conch Icon v, 1849, Achalina, pl 19, fig 105, Pfeiffer, Mon Helic Viv in, 1853, p 403 (as synonym of A ceylanica, Pfr), Banson, A M N H ser 3, v, 1860, p 465

Oleacina (Electra) orophila, Adams, Gen Rec Moll 11, 1855, p 106

Cionella (Glessula) orophila, von Martens, Die Heliceen, ed 2, 1860, p 254

Stenogyra (Glessula) orophila, Nevill, J A S B 1, 1881, p 137, pl 5, fig 19

Glessula orophila Beddome, Proc Malac Soc London vii, 1906, p. 168, Pilsbry, Man Conch. ser 2, xx, 1909, p. 79, pl 10, ng 10

Original description — "Shell conically ovate, spire arminated, sutures impressed, whorls seven in number, rounded, recularly obscurely indented, columella short, deeply arched and trincated, aperture rather small; observer

"Distinguished by the deeply arched curvature of the wiumella, and by the whorls being rather more numerous that a usual in

species of this form " (Reeve)

Hab India Mahableshwar, Anamullays, and S. (Be-

dome) Burma Pegu (Theobald)

No measurements are given by Reeve, but three memorial Mahableshwar, in the Beddome collection, possess if whome measure 18×95 mm, the same collection course nurses shells from South Cauara and the Anamullays, expend of whorls, and measuring 18×9 mm. The Theolaic action prises five shells from Pegu, one of which has the whole measures length 21.75 mm, diameter 10 mm.

Many of the specimens I have seen distinctly as air circulation

evenly spaced

410. Glessula arthuri, Benson.

Achatina arthuri, Benson, A. M. N. H. Pr. Pfeiffer, Mon Helic Viv vi, 1868, p. 24
Achatina (Electra) arthuri, Hanley & Theorie, pl. 36, fig. 3
Stenogyna (Glescula) arthuri, Nevill,

Glessula as thurs, Pfeiffer & Clessin, Nomencl. Helic Viv 1881 p 330, Beddome, Proc. Malac Soc London, vii, 1906, p 168, Pilsbry, Man Conch ser. 2, xx, 1909, p 79, pl. 10, fig. 7 (as synonym of G. orophila)

Original description:—"A testa ovato-conica, irregulariter plicato-striata, luteo-fulva, polita, translucente; spira ovato-conica, apice obtuso, sutura impressa; anfractibus 7½, convexiusculis, prope suturam subcrenulatis; apertura subverticali, elliptico-ovata; peristomate crassiusculo, callo parietali infra albido; margine columellari oblique truncato

"Long. 19, diam 10, apert long. 8 mill" (Benson.)

Hab. India: Neher, Mahableshwar (A. E. Benson, Fan bank,

Blanford)

Beddoine believed this species to be identical with G or ophila, and Pilsbry placed it under the synonymy of the latter, but, although closely allied, I consider the two sufficiently distinct, being readily distinguished from G. oriphila by the absence of impressed transverse strim, in being costulate-striate and less shining. I have seen two shells from Mahableshwar in Major Peile's collection, while a single specimen, without habitat, in the Theobald collection, possesses eight whorls and measures: length 22 mm., diam. 12 mm.; it accords well with Blanford's description and Hanley's figure No habitat was recorded There were besides several other shells labelled "arthuri," but these all pertain to or ophila

411. Glessula oreas, Reeve.

Achatina oreas (Benson), Reeve, Conch Icon v, 1850, Achatina, pl 21, fig 113, Benson, A M. N H ser. 3, v, 1860, p. 464
Oleacina (Electra) oreas, Adams, Gen Rec. Moll n, 1855, p 105
Electra oreas, Frauenfeld, Verh K.K Zool-Bot Ges xix, 1869, p 873
Achatina (Electra) oreas, Hanley & Theobald, Conch. Ind 1874, p 33, pl 78, fig 9
Stenogyra (Glescula) oreas, Nevill, J A. S B 1, 1881, p 135, pl 5, fig 11
Glescula oreas, Beddome, Proc Malac Soc London, vii, 1906, p 169, Pilsbry, Man Conch ser. 2, xx, 1909, p 80, pl. 10, fig 11

Original description :—"Shell oblong-conical, whorls seven in number, convex, finely margined at the sutures, longitudinally obscurely impressly striated, columella arched, aperture small; brown horny." (Reeve.)

The following dimensions are given by Nevill (J A S. B l, p. 135) from a Travancore specimen he received from Beddome.

"Long. 14½, diam 7¼ mill."

Hab India Nilgiri Hills (Jerdon); Tinnevelly and Travan-

core Hills, South Canara Ghats, Nullamuliavs, and Kurnool (Beddome)

Beddome thought Glessula paviei, Moriet, from Tonkin was identical with the present species, but the former has one whork

more and is considerably more slender.

Some shells from Travancore in the Beddome collection, composed of seven whorls, measure: length 14 mm., diam. 7 mm. while others from the Anamullays, also possessing seven whorls. only attain a length of 13 mm and a diameter of 65 mm. The same collection contains specimens from Kurnool, possessing seven whorks and measuring 1275 x 6 mm. One of these had the aperture closed by an opaque epiphragm, and confained five spherical eggs.

412. Glessula pseudoreas, Nevill.

Achatma oreas, Pfeiffer Mon Helie, Viv. ni, 1853, p. 495; ib.d., Conch -Cab , Bulimus, 1860, p 312, pl. 25, figs. 8, 9 (not A. oreat

(Bens), Reeve)

Stenogyra (Glessula) oreas Nevill, Hand List, i, 1878, p 168 Stenogyra (Glessula) pseudoreas Nevill, J. A. S B. l, 1881, p. 136; Beddome, Proc Malac. Soc. London, vii, 1906, p. 169, Pilsbry, Man Conch ser 2, xx, 1909, p 80, pl. 10, figs. 12, 13.

Glessila oreas, Pfeisier & Clessin, Nomencl. Helic. Viv 1581,

Glessula pseudoreae, Beddome, Proc. Malac. Soc. London, vii, 1996. p 169, Pilsbry, Man. Conch. ser 2, xx, 1909, p 80, pl. 10, ngs. 12, 13

Original description -- "T. subturrito-ovata, tenuis, levigata, parum nitida, fusco-cornea, spira turrito-conica, apice obtusa; sutura submarginata, impressa; anfr 7 vix convexiusculi, ultimus I longitudinis subæquans, basi rotundatus; columella perarcuata, albo-callosa, supra basin aperturæ elliptico-semiovalis oblique truncata; perist. rectum, acutum, margine dextro leviter arcuato

"Long 121, diam 5 mill., ap 5 mill. longa, medio 21 lata."

(Pferffer.)

Hab India. Nilgiris (Jerdon, Blanford); S. Capara Ghats and

Tinnevelly Hills (Beddome)

"Nilgiri specimens collected by Mr. Blanford (which I take for my type) measure-long. 11, diam. 5 (vix) mill and are of six whorls only." (Nevill.)

Var. subdeshayesiana, Nevill, l. c. p. 136; Pilsbry, l. c. p. 80.

"Anfr 6; long 11, diam. 44 mill. Type var. from the Anamullays (Bellome); also from the Pulney Hills (Faubank)? (Nevill.)

413 Glessula crassilabris. Benson

Achatma crassilabris Benson, J. A. S. B. v., 1836, p. 353, Pfeiffer, Mon. Helic. Viv. n., 1848, p. 261, Reeve, Conch. Icon. v., 1850, Achatma, pl. 21, tag. 81, Pfeiffer, Conch. -Cab., Bulimus, 1860, p. 313, pl. 25, tags. 12, 13; Benson. A. M. N. H. ser. 3, v., 1860, p. 464 (small var.), Blanford, J. A. S. B. xxxiv, 1865, p. 95 (dwarf var 11×6 mm)

Oleacina (Electra) ciassilabiis Adams, Gen Rec Moll ii. 1855.

Achatina (Electra) crassilabris, Pfeiffer, Malak Blatt ii, 1856, p 168, Hanley & Theobald, Conch Ind 1870, pl 36, fig 1 Cionella (Glessula) crassilabris, Martens, Die Heliceen, ed 2. 1800.

Stenogy a (Glessula) crassilabris, Nevill, Hand List, 1, 1878, p 170. Glessula crassilabris, Godwin-Austen J A S B xlv, 1876, pp 3, 315, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 330, Beddome, Proc Malac Soc London, vu, 1906, p 169, Pilsbry, Man Conch ser. 2, xx, p 96, pl 10, figs 14, 15

Original description - "Testa turrito-conica, levi, cornea, longitudinaliter striata; anfractibus convexis, suturis excavatis, labro intus incrassato; columella præarcuata, apice obtuso

"Long. 07 [=1775 mill], lat 03 poll. [=775 millm.]."

(Benson)

Hab India Sylhet (Benson); Khasi Hills (Mainwaring); Teria Ghat (dwarf var Theobald), Darjeeling (Stoliczka), Shengoth and Toruputu, Dafia Hills, Naga Hills (Godwin-Austen) Burma: Arakan (small var. Blanford)

"This shell has the habit of a Ceylon species, which I believe to be A nitens of Grav It differs in greater size, in its increassated outer lip, in its somewhat more ventricose form, and its sculpture." (Beddome)

414 Glessula naja, Pilsbry

Glessula naja (Blanford), Pilsbry, Man Conch ser 2, xx, 1909, p 90, pl 12, fig 10

Original description :- "Shell slender, turrite, thin, yellowcorneous, glossy, weakly striulate, and having vertical grooves at unequal intervals; this sculpture is most evenly developed just below the suture. Under the compound microscope glimpses of excessively weak, close spiral granule-lines may be seen in places Outlines of the spire nearly straight, a trifle contracted near the Whorls 91, moderately convex, separated by a deeply impressed simple suture Aperture a little oblique, outer lip thin, columella rather long, regularly concave, truncate at the base

"Length 19, diam 66, length of aperture 65 mm." (Pilshry) Hab India: Assam (Nevill)

"The later whorls are decidedly longer than in G tenuspina

and its immediate alies. The specimens were received from Nevill under the name used above; they may possibly be Glescola, No SO of his Hand List, since they seem related to G subfusi-forms (Pilebry)

415 Glessula orobia. Benson

Achatina orobia, Benson, A. M. N. H. ser. 3, v, 1860, p. 461, Pfeisser, Mon. Helic. Viv. vi. 1868, p. 224
Achatina (Electru) orobia, Hanley & Theobald, Conch. Ind. 1870, pl 18, hg 7, var fig 8
Stenogyra (Glessula) orobia, Nevill, Hand List, i, 1878, p 170
Glessula orobia, Pieitler & Clessun, Nomencl Helic. Viv. 1881,
p 330, Beddome, Proc. Malac. Soc. London, vii 1906, p 169; Pilsbry, Man Conch ser 2, xx, 1909, p 96, pl 10, fig 16

Original description .-- "Testa ovato-oblonga, solidiuscula lævigata, leviter struta strus nonnullis remotiusculis profunde impressis sculpta, nitida, olivaceo-cornea, spira convexe pyramidata, apice obtuso, sutura impressa anfractibus 64-71 convexiusculis ad humerum angulatis, crenulatis, ultimo } testæ superante, apertura verticili semiovali, columella valde arcuata, callosa, basi oblique truncata, peristomate recto, crassiusculo, obtuso.

"Long 11, diam 5 mill, apert 4 mill longa, 3 lata"

(Benson.)

Hab. India Sinchul and Darjeeling (Blanford); Naga Hills

(Beddome)

Some specimens in the Beddome collection, from the Naga Hills, composed of 61 whorls, measure 8x35 mm shell, possessing only six whorls, is rather convex, measuring 65×3 mm.

416. Glessula scrutillus, Benson.

Achalma scrutillus, Benson, A M N H ser 3, v, 1860, p 463, Pfeiffer, Mon Helic Viv vi, 1868, p 227

Achatina (Electra) scrutilius, Hanley & Theobald, Conch. Ind. 1870, pl. 18, fg 1

Stenogyra (Glessula) scrutillus, Nevill, Haud List, 1 1878, p 170 Glessula scrutillus, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 331, Beddome, Proc Malac. Soc. London vii, 1906, p 169, Pilsbry, Man Conch ser 2, xx 1909, p 81, pl. 10, fig 17

Original description - "Testa oblonga, solidinscula, langata, subremote striatula, nitidula, fulvo-cornea; spira ovato-oblonga, apice obtuso, sutura impressa, anfractibus 51 con exiusculis, ultimo. teste superante; apertura verticali, ovato elliptica, columella valde arcuata, basi subito et profunde truncata, peristomate recto, obtuso, marginibus callo crassinsculo junctis.

"Long 6 mill, diam 23, long apert. 21 millim" (Benson)

Hab. India: Cuttack. prov Orissa, and upper valley of the

Nerbudda (Theobald)

Allied to G gemma, but more cylindrical, with a convex spire. A specimen in the Theobald collection, from the Nerbudda Valley, with six whorls, measures 5.5 x 2.75 mm. Another shell from Malabar, having 61 whorls, has the following dimensions: length 7 mm., diameter 3 mm.

417. Glessula gemma. Reeve.

Achatina gemma (Benson), Reeve, Conch Icon v, 1850, Achatina, pl 22, fig. 123, Pfeiffer, Mon Helic Viv 11, 1853, p. 496, ibid, Conch-Cab, Bulimus, 1860, p 314, pl 25, figs 24, 25, Benson, A M N H ser 3, v, 1860, p 464 (large val).

Oleacina (Electia) gemma, Adams, Gen Rec Moll 11, 1855,

Achatına (Electra) gemma, Pfeisser, Malak Blätt 11, 1856, p 168; Hanley & Theobald, Conch. Ind 1870, pl 36, fig 7

Cionella (Glessula) gemma, von Martens, Die Heliceen, ed 2, 1860,

Stenogyra (Glessula) gemma, Nevill, Hand List, 1, 1878, p 170
Glessula gemma, Pfeiser & Clessin, Nomenci Helic. Viv. 1881,
p 331, Kobelt, Illustr Conchyl Buch, 1, 1878, p 276, pl. 85,
ing 7, Beddome, Proc Malac Soc London, vii, 1906, p 169, Pilsbry, Man. Conch ser 2, xx, 1909, p 97, pl. 13, figs 1, 3.

Original description :- " Shell. oblong-conical, rather solid, whoils six in number, rounded, smooth, columella arched, abbreviated, aperture nearly round, purple-black, shining." (Reeve.)

"Of a much darker purple-black colour than any other of the Indian species, and of shorter growth, with a shining, polished

surface " (Reeve)

Hab India: Barrackpore (Benson), Chandpore (Bacon); Jessore District, Chandbally, and Moisraka (Nevill); Rajmahal (Raban); Chandernagore (Mainwaring); Garo Hills (Godwin-Austen); Malabar plains and Beypur (Beddome) Chittagong (Raban); Arakan (Kurz)

The following measurements are supplied by Pfeiffer from specimens in his own collection (Mon Helic Viv iii, p 496).— "Long 8½, diam 4 mill., ap 3 mill longa, 2 lata," while Benson (A. M. N. H. ser 3, v, p. 464) indicates a large variety,

 8×31 mm.

It is allied to G scrutillus, but that species is more cylindrical with a convex spire A specimen in the British Museum of 53 whorls measures 6 mm in length

Var. frumentum. Reeve

Achalma frumentum, Reeve, Conch Icon v, 1850, Achatma, pl 22, fig 124. Deshayes, in Férussac, Hist. Nat Moll 11, part 2, 1851, p 169, pl. 134, figs 22-24

Achaina gemma, var frumentum, Pfeisser, Mon, Helic. Viv 111,

1853, p 496

Olencina (Llectra) frumentum, Adams, Gen. Rec. Moll 11, 1855. p 105

Cionella (Glessula) gemma, var. frumentum, von Martens, Die

Heliccen, ed. 2, 1880, p 254 Glessula gemma, var frumentum, Pfeiffer & Clessin, Nomencl.

Helic. Viv 1881, p 331, Pilabry, Man Couch, ser 2, xx, 1909. p. 99, pl 13, fig 2

The whorls are less rounded, less polished, and of a uniform lighter colour than in the type

Hab India: Chandpore, Bengal (Bacon)

This is generally paler than the type, the whorls are less

numerous, and the spire is more conoid.

The British Museum contains five specimens, labelled "Chandpore"; they are composed of six whorks and measure 65 x 31 mm

418. Glessula crassula. Reeve

Achaima crassula (Benson), Reeve, Conch. Icon v, 1850, Achaima, pl 22, fig 120, Pleister, Mon Helic Viv. 11, 1853, p 496, ibid, Conch-Cab., Bulimus, 1860, p 314, pl 25, figs 16, 17 Oleacuia (Electra) crassula, Adams, Gen Rec. Moll. 11, 1855, p 105

Achatma (Electra) crassula, Pfeiffer, Malak Blatt. 11, 1856, p 168.

Hanley & Theobald, Conch. Ind. 1870, pl. 36, fig. 4. Stenogyra (Glessula) crassula, Nevill, Hand Last, 1, 1878, p. 169 Glessula crassula, Pfeisser & Clessin, Nomencl. Helic Viv 1881, p 331, Beddome, Proc. Malac. Soc. London, vii, 1900, p 169, Pilsbry, Man Couch ser 2, xx, 1909, p 98, pl 13, fig 4.

Original description: - "Shell pyramidally councal, whorls seven an number, flatly convex, longitudinally impressly striated, sutures excavated, columella arched, conspicuously truncated, aperture small; whitish, covered with an olive horny epidermis." (Reeve.)

Hab. India: Himalayas (Jerdon); Darjeeling (Siolicaka, Mainwaring); Khasi, Dafia, and Naga Hills (Godwin-Austen);

Jaintia Hills (Beddome).

Reeve, in accordance with his invariable rule, did not mention any dimensions, but Pfeiffer gave the following measurements (Mon Helic Viv. 111, p 496) from Bensoman specimens.-"Long 9, diam 4 mill, ap. 32 mill. longs, vix 2 lata" The British Museum possesses specimens from the Khasi Hills, one of which is composed of 72 whorls and measures 155×75 mm., while another, consisting of 8 whorls, only attains a length of 14 mm, with a diameter of 6 mm.

419 Glessula pulla, Blanford

Glessula pulla, Blaniord, J A S B XXXIX, 1870, p 21, pl 3, hg 20, Beddome, Proc Malac Soc London, vn, 1906, p 169, Prisbry, Man Conch ser 2, xx, 1909, p 81, pl 13, hgs 5, 6
Achatmu (Electra) pulla, Hanley & Theobald, Conch Ind 1874, pl 78, fig 1
Achatma pulla, Pferffer, Mon Helic Viv vni, 1877, p 287
Stenogya a (Glessula) pulla, Nevill, Hand List, 1, 1878, p 166
Stenogya a (Subulna) pulla, Pferffer & Clessin, Nomenci Helic Viv. 1881, p 326

Original description — "Testa parva, turrita, tenuis, fuscocoinea, parum nitens, levigata, striatula; spira elongato subconica, lateribus convexiusculis, apice obtuso; sutura impressa. Anfr. 7–8 convexi, breves; ultimus \(\frac{2}{7}\) longitudinis sub-æquans, subtus rotundatus. Apert. obliqua, sub-ovata; peristoma tenue; columella arcuata, antice oblique truncata.

"Long 7, diam 23, ap long. 2, diam 12 mm." (Blanford.)

Hab India: Torna, near Poona (Evezard, Blanford).

"This is allied to A Fairbanks, Be, but distinguished by its more conical spire, smaller size, and darker colour." (Blanford.)

420. Glessula malabarica, sp. n.

Shell cylindrico-conoid, rather solid, translucent, pale corneous, slightly shining, with impressed transverse lines, regularly spaced Spire conoid, slightly convex; suture impressed, subcrenulate,



Fig 135 - Glessula malabarica

apex slightly obtuse Whoils 7½, very slightly convex, gibbous near the upper suture, the last equalling in width ½ of the entirelength of the shell, shortly ascending in front Aperture vertical, semi-ovate, parietal callus scarcely perceptible, peristome thickened; outer and basal margins regularly curved, columella arcuate, truncate

Length 75, diam 3 mm.

Hub India Malabar (type), Travancore (Beddome) Type in the British Museum

The Beddome collection contains five specimens from Malabar, one being whitish corneous, and a dozen from Travancoie,

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labelled "in sp near pulla." G. mulabarwa differs from that species in having a more convex spire and in boing of more solid texture, with a thickened peristome, while the last whorl shortly ascends in front. So no of the Trivancore specimens are a triffe larger, measuring 8.5 mm, in length, and several are of a darker forcous colour.

421. Glessula paupercula, Blanford.

Acheema paupercula Blanford, J A S B xxx, 1801, p 362, pl 1, ig 16. Pfeifier, Mon Helic Viv vi, 1863, p 227, Hanley & Ti cobald, Conch Ird 1875, pl 102 bg 1 Stenogyra (Glessula) paupercula, Nevill, Hand List, i, 1878, p 163 Glessula paupercula, Pfeifier & Clevin Nemend Helic, Viv 1881, p 331. Beddome, Proc. Malec Soc. London, vii, 1906 p 170, Pilabry, Man Corch, ser 2, xx, 1909, p 81, pl 13, fig 9 Glessula recompresa (Nevill), Beddome, f c p 170

Original electricition.—"Testa turrito-oblonge, solidule, intidula, fulso corner, impresso striata, spira turrita, lateribus vix convexis, apice obtuse, suture sub marginate. Ante 7, param convexi, ultimus 1 longitudinis subsequens. Columella valde archata, basì antice truncata. Apertura orali-pyriformis; peris'oma rectum, intus vix labiatum, marginibus callo junctis

"Long. 9, diam 31 .nm , ap 3 alta, 2 lata" (Blanford)

Hab. Indra: Kolamullays, Patchamullays, and Shevroy Hills (King, Foote); Shevroy (Oldham), Salem, Anamullays, Tinne-

velly, Travancore Hills, and Kurnool Hills (Beldome)

"The nearest ally to this small species appears to be the Darpling of crassila, B. From this it is mainly distinguished by the shape of the spire, which is more convex at the side, by its smaller breadth compared with its length, and by its more marked and slightly marginate sutures. A pumpercula is probably common upon the Shevroys. All the specimens, however, found by Mr. King at that locality are bleached, two specimens from the Kolamulhes alone retaining their original texture." (Blanford)

Var. nana, Beddome, 1 c. p 170

"A shorter more obtuse form, occurring occasionally with the type form, and very like sattaraensis, but shorter" (Beddome.)

I found some specimens of the form nana from Tinnc elly in the Beddome collection, having only six whorls and measuring 5 mm in length. It approaches subjection, especially the var. minor, but the latter has a more convex spire. In the same collection I found a large quantity of shells, from the Kurnool Hills, labelled "G inconspicua, Nevill MS," which I am unable to separate from paupercula. I heritated before recording this fact and thus adding another superfluous MS name to literature, already encumbered with so many of these, but having found

specimens similarly labelled in Major Peile's possession, it appears probable that shells have been distributed under this name, and therefore may be found in many other collections.

422. Glessula sattaraensis, Hanley & Theobald.

Achatina fusca, H Adams, P Z S 1868, p 15 (not Achatina fusca, Pfeiffer, P Z S 1852, p 67).

Achatina (Electra) sattar gensis (H. Adams), Hunley & Theobald.

Conch Ind 1874, pl 78, fig 4

Achatina sattar acusis, Pfeister, Mon. Helic Viv vin, 1877, p 281 Stenogin a (Glessula) sattaraensis, Nevill, Hand List, 1, 1878, p 167 Glessula sattaraensis, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 331, Jousseaume, Mém Soc Zool France, vii, 1894, p 293, Beddome, Proc Malac. Soc. London, vii, 1906, p 170, Pilsbry, Man Conch ser 2, xx, 1909, p 82, pl 13, figs 7, 8

Original description — "G testa oblongo-turrita, soliduscula, lævigata, obscure striata, nitida, fusco-cornea; spira turrita, apice obtusiusculo, sutura impressa, crenulata; anfr 7. convexiusculis, ultimus & testæ paulo superante, apertura parum obliqua, ovale, columella callosa, valde arcuata, oblique truncata; perist recto, obtuso, albido marginato, marginibus callo tenui iunctis

"Long 81, diam. 4 mill" (Adams)

Hab India: Sattara, Bonibay Pres (Layard) Ceylon: Saharumpore (Hanley & Theobald), Rambaddy Ghats (Beddome); Nuwara Eliya (Simon)

Beddome gives Glessula fusca, H Adams, as a synonym of G. parabilis, Bens (Proc Mulac. Soc London, vii, p 204), evidently owing to a lapsus for G. fusca, Pfeisfer, as on page 170 (tom cit) he correctly enumerates the former under the synonymy of G sattar aensis G. fusca of Pfeiffer was believed by Hanley and Theobald to be near if not identical with G. parabilis

The only specimen of G. sattar aensis I have seen is in the British Museum and is from the collection of H. Adams agrees in every respect with the description and with the figure

in Conch. Ind.

423. Glessula capillacea, Pfeiffer.

Achatma capillacea, Pfeister, P Z S 1854, p 294, ibid, Mon Helic Viv iv, 1859, p 614, Hanley & Theobald, Conch Ind. 1876, pl 156, fig 3

Achatma (Subulma) capillacea, Pfeiffer, Malak. Blätt 11, 1856,

Glessula capillacea, Nevill, Enum. Helic Ceylon, 1871, p 3, Jousseaume, Mém Soc. Zool. France, vii, 1894, p 292, Beddome, Proc Malac. Soc. London, vii, 1906, p 170, Pilsbry, Man Conch ser 2, xx, 1908, p. 55, pl 7, fig 5.

Stenogyra (Subulma) camillacea, Pfeiffer & Clessin, Nomencl Helic.

Viv. 1881, p. 326

Original description -"T turrita, tenuis, sub lente capillaceostriata, nitida, pellucida, virenti-cornea; spira elougata, apice obtusnia; anfr. 73 convexi, ultimus & longitudinis vix æquans, peripheria obsoleto angulatus: apertura vix obliqua, sinuatoovalis: columella arcuata, oblique truncata, perist simplex

"Long. 9, diam. 4 mill, an 3 mill longs, 2 late" (Pfeiffer)

Hab Ceylon (Thwaites), Haycock Mountain (Beddome)

The type in the Caming collection only measures 35 mm in diameter, not 4 as stated by Pfoiffer. There are also three specimens, presented by Mr. Preston, one of which is composed of nine whorls and measures 12 mm in length and 35 mm. in diameter.

This species is allied to G colletto, but has the whorls more closely coiled and a broader base.

424. Glessula collettæ, Suka.

Glessula colletta, Sykes, Proc Malac. Soc London, ni, 1898, p 73, pl 5, fig 1, Gollett, J A. S Ceylon Branch, xvi, 1900, p 138, Beddome, Proc. Maine Soc London, vii, 1906, p 170, Pilsbry, Man Couch zer 2, xx, 1908, p 60, pl 7, hg 13

Original description -"Testa elongata, tenuis, levigata, obscure longitudinaliter striata, nitida, brunnea vol fusco-cornea, apice obtusiusculo; autura impressa; anfr 6-63, convexiusculi, ultimus I altitudinis testre mouans, apertura fere verticalis, lunato-ovalis. marrine columellari calloso, pullidiore oblique truncato

"Alt 8, lat 28 mm." (Suker.)

Hab Ceylon. Ambagamuwa (Mrs. Collett).

"Allied to G. sattaraensis, H Ad. (=G. fusca, H. Ad., nom. procece.), which is recorded from "Saharumpore, Ceylon," in the Conch Ind, but I do not know on whose authority. It was described and figured from "Sattara, Bombay," by Adams, and it may be remarked that the figure in the Conch Ind (pl. lxxviii. fig 4) does not quite resemble that given by Adams (Proc Zool Soc. 1868, pl. 11, fig 10) I expect that the G. sattarnensis of Dr. Jousseaume, cited from Numbra Eliya, is the present species. which is more elongate and slender than the true G sattaraensis" (Sykez)

"Topotyes before me are rather dark yellowish chestnut colored, with sculpture of impressed vertical grooves are rather widely separated on the later whorls, but close above. Nearly two whorls at the summit are smooth Length 8, diam. 29, aperture 29 mm. long whorls 61. Compared with G p taprobanica, this is a more slender shell; hence the whorls appear longer, and they are more evenly convex, the suture being less narrowly impressed" (Pilebry)

I find G. collettæ is allied to G. gracilis, Bedd, but it is darker in colour, the spire is a little more slender, and the aperture narrower In the British Museum are three unnamed specimens from Ousalava, Ceylon, presented by Mr. Preston These undoubtedly pertain to the present species.

425 Glessula subjerdoni, Beddome.

Glessula subjerdom, Beddome, Proc Malac Soc London, vii, 1906, p 170, pl 15, hg 2, Pilsbry, Man Conch ser 2, xx, 1909, p 83, pl 8, hgs 3, 4

Original description — "Testa oblongo-turrita, tenuis, leviter striatula, nitida, subpellucida, fulvo-cornea, spira subturrita, ad apicem obtusiuscula, sutura impressa, anfractus 7-8, subplaniusculi, ultimus 4 longitudinis vix æquans, basi attenuatus; columella leviter arcuata, paulo supra basin aperturæ truncata; apertura verticalis, semi-ovalis, peristoma simplex, obtusiusculum.

"Long 11, diam 35 mm; apertura 25 mm longa, 2 lata."

(Beddome)

Hab India Jeypore and Golcondah Hills, east side of Madras Presidency, Anamullays, Tinnevelly, Sikkim, Darjeeling (Beddome)

"A smaller and more slender shell than jerdon, and much larger than paupercula, of which it may be a large form"

(Beddome.)

"A specimen evidently near subjection, but purchased as G jectioni, and said to be from the Nilgiris, is figured pl 12, fig 16 Below the suture there are vertical grooves, strong and regular on the shoulder, but rapidly weakening downwards. The lip is rather thick and whitish-edged. It is a wider shell than C p. taprobanensis, which seems to be closely related Length 9 2,

diam. 39, aperture 325 mm., whorls 7." (Pilsbry.)

Several shells from the Golcondah Hills, in the Beddome collection, do not exceed 105 mm in length, although the diameter measures 4 mm, but some specimens from Darjeeling measure 115×4 mm. The same collection contains shells from Tinnevelly, having seven whorks and measuring 825 mm. in length, and several from Jeypore, labelled var minor, 85 mm in length. Finally I tound specimens from the Anamullays, which were labelled paupercula, but which certainly must be referred to G. subjection

426. Glessula gracilis, Beddome.

Glessula gracilis, Beddome, Proc Malac Soc London, vii, 1906, p 170, pl 15, fig 9, Pilsbry, Man Conch ser 2, xx, 1909, p 83, pl 8, figs 17, 18.

Original description:—"Testa parva, cylindrico-turrita, solidula, vix nitens, evidenter striatula; spira elongata, ad apicem obtusa; sutura impressa, crenulata; anfractus 8 planiusculi, ultimus 3 longitudmis vix æquans, basi parum attenuatus, columella parum obliqua, paulo supra basin aperturæ truncafa; apertura vérticalis, semi-ovalis; peristoma intus albidum, obtusum

"Long 11, diam. 2 mm, apertura 25 mm longa, 1.5 lata."

(Beddome)

Hab India Nilgiri Hills, Jeypore, and Shevroy Hills;

Travancore (Beddome)

"The Jeypore specimens are slightly larger, the whorls rather more convex, and slightly angular close to the sutures."

(Beddome)

The type in the British Museum has the upper margin of the peristome slightly damaged and the outer margin descends nearly straight, a fact not mentioned in the diagnosis; and whereas its length is given as 11 mm, it only measures 95 mm. A specimen, from the Shevroy Hills, in the Beddome collection possesses nine whorls, which are a trifle less convex than in the type; it measures 11 mm in length. The same collection also contains specimens from the Shevroy Hills, which were unnamed

427 Glessula neglecta, sp n

Shell elongate-conoid, translucent, rather thin, fuscous corneous, glossy, finely and regularly striated. Spire narrow, scarcely convex, suture rather deep, subcrenulate apex obtuse. Whorls 7, convex, increasing slowly and regularly, the last equalling in width 2 of the entire length of the shell, ascending a little in



Fig 136 - Gleszula neglecta.

front Aperture nearly vertical, broadly obovate, the margins united by a thin callus on the parietal wall. Peristome thickened, outer and basal margins curved; columella slightly arcuate, obliquely truncate

Length 9, diam. 35 mm

Hab India - Anamullays (Beddome) Type in the British

Seven specimens of an undetermined species were found in the Beddome collection Its nearest ally appears to be G. gracilis, but that species has a narrower base, is much more strongly stricted, the whorls are less convex, the last whorl is narrower.

the spire is more cylindrical, and the aperture smaller, while finally it is of a different hue and its texture is much less glossy.

Some of the specimens are immature, but one possesses 73 whorls and measures 10×35 mm

428 Glessula pusilla, Beddome.

Glessula pusilla, Beddome, Proc Malac Soc London, vii, 1906, p 171, pl. 15, fig 5; Pilsbry, Man Conch ser 2, xx, 1909, p 84, pl 8, figs 9, 10.

Original description —"Testa turrito-oblongo, tenuis, nitidula, luteo-cornea, leviter striatula; spira turrita, ad apicem obtusa; sutura crenulata, anfractus 6-6½, parum convexi, ultimus ½ longitudinis æquans; columella valde arcuata, basi antice fere verticaliter truncata, apertura semi-ovalis; peristoma rectum, albidum.

"Long 5-55, dian. 1.75-2 mm; apertura 1.5 mm longa, 1 lata" (Beddome)

Hab India · Anamullay Hills, Shevroys, Nilgiris (Beddome).

Ceylon Rambaddy Ghat (Beddome)

"Much smaller than collettæ, its nearest ally, with weaker

sculpture and paler colour " (Beddome.)

There is something wrong about the measurements given by Beddome, since the type, which was presented by him in 1906 to the British Museum, composed of $6\frac{1}{4}$ whorls, measures 6.5×2.5 mm.

429 Glessula courtallica, sp. n.

Shell cylindrico-conoid, thin, polished, translucent and dark fulvous corneous when in fresh condition, very minutely striulate Spire narrow, with nearly straight sides; suture impressed, apex obtuse Whorls $6\frac{1}{2}$, convex, increasing regularly, the last rather



Fig. 137.—Glessula courtallica

suddenly. Aperture oblique, subovate, peristome with acute margins, no perceptible callus on the parietal wall, outer margin slightly curved, sinuous in outline, basal margin regularly curved; columella deeply arcuate, obliquely truncate.

Length 65, diam. 2 mm

and slightly flexuous on the last whorl, spire turreted, with very obtuse apex and excavated suture; whoils six, scarcely convex, the last one rounded at base, aperture vertical, subquadrilateral, with a much thickened white peristome, columella broadly reflected, thickened, white, curved, forming an acute tooth, with a well developed incised notch at its base

"Long. 7, diam. 3 mill" (Nevill, 1881)

China. Ponsee. Yunnan (type) Bhamo. Hab. Burma

(Anderson)

"This species closely resembles Glessula pequensis, Blanford, but is less convex, that is, more slender, and of thicker texture, it can also be easily distinguished by the characteristic, crowded, well-developed, nearly perpendicular, longitudinal striation, varying slightly in direction on each whorl, much as in many species

of Pomatras The columella also is peculiar." (Nevill)

When first publishing the name Glessula blunfordiana, Nevill only added very few words of description and gave no dimen-This referred to the type from Ponsee, in Yunnan. collected by Anderson Although he does not expressly state this, it may be presumed that the Bhamo specimens were also collected by Anderson He subsequently, in 1881, gave a full description which has here been copied. Although the type is stated by Nevill to be in the Indian Museum, the species is not included in his 'Hand List of Mollusca in the Indian Museum'

432. Glessula peguensis, Blanford.

Achaima peguensis, Blanford, J A S B xxxiv, 1865, p 78, Pfeisfer, Mon Helic Viv vi, 1868, p 228, Hanley & Theobald,

Closch Ind 1875, pl. 102, fig 6

Glessula pequensis, Theobald & Stoliczka, J A S B xli, 1872, p 334, Pfeiffer & Clessin, Nomencl Helic Viv. 1881, p 331, Beddome, Proc Malac Soc London, vii, 1906, p 171, Pilsbry, Man Conch ser 2, xx, 1909, p 99, pl 13, fig 12

Stenogyn a (Glessula) pequensis, Nevill, Hand List, 1, 1878 p 171

Original description —"Shell oblong ovate, rather solid, dark reddish brown, horny, marked with distinct and regular impressed Spire convexly conical; apex obtuse, suture impressed, subcrenulate. Whorls 61, slightly convex, the last ascending a little towards the mouth, and exceeding 1 of the shell in length Aperture vertical, truncately semicircular; peristome obtuse, slightly thickened, margins joined by a callus; columella very much curved, projecting forwards at the base, subvertically truncated within the peristome

"Length 7, diam $2\frac{1}{2}$, length of aperture $2\frac{3}{4}$ millim" (Blanford.) Hab. Burma · Irawadddy Valley, Pegu and Thyet Myo (Blanford); Arakan Hills (Kurz), Kumah Hill and near Mai-i, Sandoway District, Arakan (Theobald & Stoliczka); Chittagong

(Raban)

"A pretty little species, darker in colour than any of its allies, except perhaps A gemma, Bens., and easily distinguished from all by the columella being more arcuate, also by its more acuminate spire and blunted apex, and its much stronger sculpture" (Blanford)

The species is also allied to satturaensis, but the base is pro-

less prominent

Pilsbry figures a specimen which slightly exceeds Blanford's measurements, being 89 mm in length, diam 39, longest axis of aperture 3 mm., whorls 67. The nex is smooth; the rest of the shell is closely and rather deeply but irregularly striate, and very glossy.

Four specimens from Pegu, in the Beddome collection, measure.

length 65, diam 75 mm

433. Glessula brevis, Pfciffci.

Achainna breris, Pfeisser, P Z. S 1861, p. 387, ibid, Mon Helic

Viv vi, 1868, p 227

Achatma (Electra) brevs, Hanley & Theobuld, Couch Ind 1870, pl. 18, fig 10

Stenogyra (Glessula) brevis, as of Blanford, Novill, Hand List, 1, 1878, p 166

Glessula brevis, Pfeisser & Clessin, Nomenci Helic Viv 1881, p 331, Beddome, Proc Malac Soc London, vii, 1906, p 171, Pilebry, Man Conch ser 2, xx, 1909, p 85, pl 13, fig 13

Original description —"T conico-ovata, tenuis, pellucida, fulvo-corner; spira conica, apice obtusulo, anfr. 6, modice convexi, striis a sutura descendentibus deorsum evanescentibus distincte sculpti, ultimus spira paulo brovior, rotundatus, columella antrorsum torta, fere horizontaliter truncata, apertura fere verticalis, sinuato-ovalis; perist, simplex, tenue

"Long 8-9, diam 5-51 mill" (Pfeiffer.)

Hab India Ahmednuggar, Poona (Blanford); Jeypore Hills

(Beddome)

Beddome observes that Hanley's figure is too broad towards the base, and does not show the sculpture, which is peculiar. He also states that his Jeypore specimens were named microsculpta MS, by Nevill, but he could not see how they differed from brevis. It is unfortunate, I consider, that he burdened literature with another MS name

In the Cuming collection I found four specimens accompanied by a label in Pfeiffer's handwriting; they consist of 62 whorls and measure 11.75 mm in length and 6 mm in diameter. The Beddome collection also contains three shells from Poona, which agree fairly well with the type

434. Glessula filosa, Blanford.

Glessula filosa, Blanford, J.A.S. B xxxix, 1870, p 19, pl 3, fig 16, Pfeiffer & Clessin, Nomencl. Helic. Viv. 1881, p 330, Beddome, Proc Malac Soc London, vii, 1906, p 171, Pilsbry, Man Conch. ser 2, xx, 1909, p. 85, pl. 13, fig. 14

Achatina (Electra) filosa, Hanley & Theobald, Conch. Ind. 1870, pl. 36, fig. 10

Achatina filosa, Pfeiffer, Mon. Helic. Viv. viii, 1877, p. 279

Stenogyra (Glessula) filosa, Nevill, Hand List, i, 1878, p 168.

Original description:—"Testa sub-rimata, turrita, tenuis, cornea, verticaliter plicato-striata, parum nitida; spira elevata; apice obtuso, brevissime conico, sub-mucronato, sutura impressa. Anfr. 8 convexi, ultimus 4 longitudinis sub-æquans, basi rotundatus.

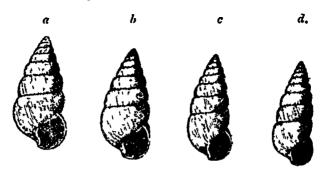


Fig 138 --- Glessula filosa.

Apertura verticalis, lunato sub-ovalis; peristoma rectum, tenue; columella arcuata, albida, lamelliformiter extante, tenui, oblique truncata

"Long. 21, diam. 9 mm. Apert. 7 mill. longa, 5 lata" (Blanford.)

Hab. India Travancore and Tinnevelly (Beddome); Shevroy

Hills (Henderson).

"A peculiar form easily distinguished by its strong sculpture, abrupt subconical apex, and by the columella standing out from the last whorl, so as to have a groove running along its side" (Blanford)



Fig 139 — Glessula filosa, var exigua

This species varies considerably in contour and size, but the groove by the side of the columella, referred to by Blanford, is not always perceptible. The four shells from Travancore here figured, which are in the Beddome collection, give some idea of the range

in size and shape, their dimensions are as follows.—fig. 138 a, $26 \times 12 \,\mathrm{mm}$, fig. 138 b, $25 \times 11 \cdot 25 \,\mathrm{mm}$; fig. 138 c, $24 \times 9.75 \,\mathrm{mm}$; fig. 138 d, $23.75 \times 9 \,\mathrm{mm}$ In the British Museum are four shells from Tinnevelly, composed of $8\frac{1}{2}$ whorls and measuring $19 \times 7 \cdot 75 \,\mathrm{mm}$

Var. exigua, n

Differs from typical filosa, besides being smaller, in having the whorls more turned and the suture deeper; the last whorl also contracts somewhat towards the aperture

Length 125 mm., diam 6 mm (8 whorls) Hab. India Sirumullay Hills, Dindigal.

This form I found in the Beddome collection intermixed with G. subfilosa

435. Glessula subfilosa, Beddome.

Glessula rulfilosa, Beddome, Proc Malac. Soc. London, vi., 1906, p 171, pl 15, fig 8, Pilsbry, Man Conch ser 2, xx, 1909, p 86, pl 8, figs 15, 16

Original description —"Testa elongato-turrita, tenuis, fulvo-cornea, distincte plicato-striata; spira elongata, ad apicem sub-obtusa, elongato-conica, sutura impressa; anfractus 10 planiusculi, ultimus subcarinatus ½ longitudinis tortius vix aquans; apertura lunato-subovalis; peristoma tenue; columella valde arcuata, oblique abrupte truncata.

"Long 16, diam. 5 mm; apertura 5 mm. longa, 3 lata."

(Beddome)

Hab India Strumullay Hills, Dindigul; Kurnool (Beddome)
"The prominent sculpture is like that of filosa, but it is a
very much smaller shell, with a much more elongated apex."
(Beddome)

The type, which is in the British Museum, appears not quite full grown; it possesses 93 whorls, and measures length 175 mm, diameter 65 mm. It will be seen that these details do not agree

with those given by Beddome when describing the species

The principal character separating this species from G filosa is the attenuated spire, concive near the apex, which is obtuse, not acute as in the latter. The aperture is also less high in proportion to its width.

436. Glessula lyrata, Blanford

Glessula lyrata, Blanford, J A S B. xxxix, 1870, p 20, Pfeisser & Clessin, Nomencl Helic Viv 1881, p 331, Beddome, Proc Malac Soc London, vii, 1906, p 172, Pilsbry, Man Conch ser 2, xx, 1909, p 86, pl 13, fig 15

Achatina (Ect. a) rugata, Hanley & Theobald, Conch Ind 1870,

pl 18, fig 9 Achatma rugata, Pfeiser, Mon Helic. Viv viu, 1877, p 281

Slenogyra (Glessula) lyrata, Nevill, Hand List, i, 1878, p 167

Original description — "Testa ovato-turrita, solidula, cornea, parum nitida, verticaliter costulato-plicata, sub-lente lineis minutissimis confertis spiralibus, sæpe obsoletis, decussata; spira pyramidalis, lateribus vix convexis, apice obtusulo, sutura profunda. Anfr 7½ convexi, infra suturam obsolete sub-angulati, ultimus antice paulo ascendens. Apertura verticalis, truncata, semiovalis, peristoma obtusum; columella mediocriter arcuata, antice oblique truncata

"Long 12, diam. $5\frac{1}{2}$, ap long 4, lat. $2\frac{1}{3}$ mm" (Blanford)

Hab. India Mahableshwar, and Khandala, W. Ghats (Blan-

ford).

"This shell resembles in form A. oreas, Bens, but it is distinguished from that and all other allied species by its stronger sculpture. Possibly the two varieties should be ranked apart, as there is considerable difference between them. A third form, shorter and more tumid, occurs near Poona. As other intermediate varieties probably exist, I prefer for the present classing all in one species, but it may hereafter be desirable to distinguish them

Var matheranica, Blanford, l. c. p 21, pl. 3, fig. 19, Pilsbry, tom. cit p 87, pl. 13, fig 16

Stenogyra (Glessula) mathelanica, Nevill, Hand List, ; 1878, p 167

"Minor, magis polita, lineis spiralibus carentibus, sculptura in anfractu ultimo obsolescenti.

"Long 10, lat $4\frac{1}{2}$ mill." (Blanford) Hab. India. Matheran, near Bombay.

It is rather surprising that Blanford should have compared this species with or eas, while overlooking its much closer affinity with filosa described in the same paper, the sculpture being very similar. The latter is, however, a larger shell with broader base

and acute apex.

In typical specimens of G lyrata the last whorl is not wider than the penultimate and ascends a little in front, while the spire is concave. The variety matheranica, on the other hand, has a convex spire; it is, moreover, considerably smaller, and the sculpture is much less apparent on the base. The two forms are, perhaps, as suggested by Blanford, entitled to rank as distinct species, but I have not seen sufficient material to form a definite opinion. Major Peile has sent me for inspection some shells from Mahableshwar, one of which possesses 8 whorls and measures 13×6 mm, another, of $7\frac{1}{2}$ whorls, measures 11.5×5 25.

437. Glessula rugata, Blanford.

Glessula rugata, Blanford, J. A S B xxxix, 1870, p. 20, pl 3, fig 18, Beddome, Proc. Malak Soc London, vii, 1906,

p 172, Pilabry, Man Conch ser 2, xx, 1909, p 87, pl 7, lips 11, 12

Addition runate, Hanley & Theolaid Conch and 1875, pl 102, fix 7. Pfeiffer, Mon Helic Viv. viii 1877, p 293

Stemmera (Glesnils,) rugata, Nevill Head List, 1, 1878, p 163

Attacopea (Salutra) rugata, Pfeiffer & Cleans, Nomenal Helic Viv. 1881, p 325

Original description :-- Testa turrite, comes, tenuis, parum nitida secticulter confertim plicato striata striis sub-lente minute et regularite granulates, interstitus lineis minutis confertis transfersis (spiralibus) in anfrectibus superis validioribus, decusents, ap ra clongeto conica; apica obtusa, satura profunda Anfr. 7; consexe, ultimus i longitudines sub-aquans. Apertura obliqua fero osata, peristores tenue, restum columella salde arcusta, antice oblique trancata.

"Long, 6, deam 2 mm., ap 11 mill, longs, 1 lata" (Blanford)
Heb Index Singhur mer Peous (Blanford); Poorundhur

(Eregard)

"No described Indian species of Glazula possessis sculpture at all resembling that of the present small form. Under an ordinary least the shell appears to have a plicate structure, but beneath a stronger power the strice are seen to be regularly nodese, and the decreasing lines become distinctly visible. The markings are very (legant and regular, almost resembling those on some West Indian forms of Cyclosveride, as Cheanopana." (Blanford)

The form taken by Everard at Poorundhur, in the Bombay Presidency, is reparated by Blanford as "var. major, long 7 mill"

The Beddome collection contains a veral ap cimens from Singhur Hill. These are sufous corneous and exhibit the decussating apprais referred to be Blanford, which are excessively fine and close, being especially not coable in fresh shells. The Cuming coll ston also contains four specimens.

435 Glessula latestriata, Mollendorff

Glessula Ictestriata, Mollendorff, Nachr Deuts Malak Ges 1839, p 166, Beddome, Proc Malac Soc London, vii, 1903, p 172, Pilsbry, Men Conch ser 2, xx, 1903, p 100

Original description:—"T, ventricosulo oblonga, tenuiuscula, subpellucida, strus impressis sat distrittibus peculiariter sculpta, corneo-flavesceus. Spira modico elongata lateribus convexiusculis, apico acutulo. Antr 7 modice convexi, sutura bene impressa, subcrenulata disjuncti. Aport fere verticalis, rotundato-rhomboidalis, peristoma rectum, obtusum, columella sat torta, abrupto truncato.

"Diam. 45, alt 10, apert. long. 35, lat 225 mm" (Mollen-dorff.)

Hab Burma · Southern Shan States (Stribell)

A small form not seen by me

439. Glessula simoni, Jousseaume.

Glessula sumoni, Jousseaume, Mém Soc Zool Fiance, vii, 1894, p 293, pl 4, fig 10, Beddome, Proc Malac Soc London, vii, 1906, p 172, Pilsbry, Man Conch sei 2, xx, 1908, p 61, pl 7, fig. 8.

Original description — "Testa parva ovata, tenuis, costulata, nitida, pellucida, fulvo-cornea, spira conoidea apice obtusiuscula, sutura impressa, anfr 5-6 convexi, ultimus demidium longitudinis æquans, basi vix attenuatus, rotundatis; apertura verticalis, semiovalis, perist rectum, tenue, acutum, margine dextra minus arcuato, columella callosa, subrecta, valde arcuata, oblique truncata ad umbilicum appressa et depressa

"Alt 3 mill , diam 15 mill." (Jousseaume.)

Hab. Ceylon: Slopes of Pedro, Nuwara Eliya (Simon)

Four live specimens were taken by Simon, but two of them were younger than the one made the type by Jousseaume, which he considered immature.

"This minute form has about the size of a Toi natellina, but seems to be more strongly sculptured than is usual in that genus. The embryonic whorls are smooth, a little darker than the rest of the shell" (Pilsbry) The latter statement is evidently a lapsus, for Jousseaume distinctly states that they are less dark than the remainder of the shell

Genus DIGONIAXIS, Jousseaume.

Digomaris, Jousseaume, Bull. Soc. Malac France, vi, 1889, p 349, Pilsbry, Man Conch ser 2, xix, 1908, p 288

'Ce genre est remarquable par son axe columellaire autour duquel se déroulent deux lamelles très saillantes, dont la plus forte s'aperçoit sui tout le prolongement de l'axe, grace à l'extrême ténuité du test; par son dernier tour méplan à la partie médiane et sur une étroite zone circumsuturale, et caractérisé par deux angulosites, dont l'une supérieure sépare la zone méplane-tectiforme du pourtour de la suture de la surface plane médiane, et dont l'autre limite cette surface à la partie inférieure.' (Jousseaume)

"A genus of uncertain position, possibly near Calaxis, as M Jousseaume believes, but differing in the longer spire and the strong development of a spiral lamella superposed upon the upper part of the columella. There are no parietal or palatal lamellæ. The internal axis, as seen through the shell, is strongly spiral, the upper lamella penetrating deeply, according to Jousseaume. It is possible, however, that the spiral condition is due to the basal lamella." (Pilsbry)

440. Digoniaxis cingalensis, Benson

Spiraxis cingalensis, Benson, A. M. N. H. ser 3, xi, 1863, p. 91.

Pfeiffer, Mon. Helic. Viv. vi, 1868, p. 191. Hanley & Theobald, Conch. Ind. 1874, pl. 79, fig. 1.

Stenegary (Syaratia (Erspiratia)) eingaleusia, Pleisser & Clessin, Nemore: Helic Viv Ir81, p. 323

Theorem, or polemer Journaume, Mem Soc. Zool France, vii, 1811 p. 211, Prisbry, Man Couch ser 2, xviii, 1906, pl. 4, i.g. 19, xix, 1808, p. 250

Ordenti decerra a - "S testa subrimata, subulato-turrita, gracile, solida, polita, struciula struc minutis confertissimis undulatis spiralitus decussata, spira elongata, superne sensin attebunta, apica -----". sutura vix impressa, irregulari, nufractibus supersitibus II (aprealibus deficie itibus), planulatis, ultimo ad besin rotundato; speriura sulcobiqua, emarginato elliptica, peristomate recto, intus sel sugulum superiorem calloso, margine dextro superne arcuato, hassi incressato, columellari calloso, expansinsculo, subrefero, superne plica obliqua spirali solida munito

"Long 14, diam 4 mill, ap long 3, diam 14 mill" (Benson)

He' I' vlon . Westermoone, Matelle (Leyred).

"A Spread-like whill, differing from Tortaxis by the spiral plant on the upper part of the columnilla. Its solidity causes me to place it in Digmaxis with some doubt, especially since it belongs to a different faura." (Pistory)

Family SUCCINEIDÆ.

Genus SUCCINEA, Draparnaud

Simmer, Diriparmand, Tabl Moll. Terr flow I rance, 1801, p. 55, C. Pfeiffer, No. An edn. Heschr Land- und Wasserschn. 1821, p. 16. Gray in Torton, Manual, 1810, p. 177, Pfeiffer, Mon. Helle Vir. i. 1844, p. x., Adams, Gen. Rec. Moll. ii, 1855, p. 128. Inhuann, Ind. Schir Mirch Ling Stettins, 1873, p. 19 (anatomy), Tiecher, Man. Conchyl. 1883, p. 490, fig. 261 (radula).

Type: (first species) Heliv putris, Linné (=Sucrinea oblonga, Driparmud)

Range All parts of the globs

Shell imperforate, oval, thin, horny, more or less translucent, spire conical, short, whorls rapidly enlarging, the aperture large, oblong, columnia simple, peristome simple, acute

Animal with a large foot; tentacles short, the upper pair conoid, swollen at the lisse, the lower pair scarcely visible, some-

times absent

"The hermaphrodite gland, both as regards structure and position, does not exhibit any special features, the same applies to the thick, sausage-shaped hermaphrodite duct which is very prominent on account of its dark coloration, derived from the superimposed pigmented cells of the connective tissue. Both before and after pairing time I found it crowded with spermatozoa. The epithelium is not vibratory. Where it approaches

the albumen gland it contracts considerably, enlarging inside the latter to a pouch of about 2 mm. in size. This inflation, which I propose to designate as a fecundation pouch, has not been described either in Succinea or other Pulmonates applies to the two seminal vesicles opening out into it latter are two club-shaped vesicles, whose solid walls consist of an integument of connective tissue and a non-vibratory epithelium. These large seminal vesicles at once arrest the attention during preparation, without the aid of a lens Close to this occurs the opening of the hermaphrodite duct. The efferent ducts of the albumen gland open out on the opposite side Downwards the fecundation pouch is continued in the uterus on the one hand. and on the other in the male duct, which does not, as in Helia, run for some distance as a groove in the wall of the uterus, but separates above from the uterus at the albumen gland fecundation pouch is invested with a cylinder epithelium, which is raised into numerous broad folds, of which sometimes one, at other times several are covered with epithelium. Immediately below the fecundation pouch the uterus is provided with a short cæcum-like appendage, invested by a cylinder epithelium, the walls of which are repeatedly thrown into folds and, on account of their white colour, very prominent. Thence the uterus descends in numerous spiral twists around a vessel-trunk, serving as axis The walls assume a transparent gelatinous aspect. Upon microscopic examination, the outer layer is found to consist of a homogeneous tender membrane with embedded granules, and invested anteriorly with a large-meshed network of fine vessels, the interstices being occupied by large globular pale cells might easily be imagined these were unicellular glands, but no efferent openings could be observed in any of them

"If therefore these cells are concerned in the secretion of mucus, in which the perfect ova are embedded, their contents must penetrate into the cavity of the uterus through the delicate membrane of these cells. The lower part of the uterus is somewhat more dilated and not coiled. It is very prominent owing to its reddish colour. The narrow and rather short duct of the receptaculum seminis joins the uterus not far from the external

genital orifice

"The lower portion of the uterus, from this point to the external orifice, may be fitly designated as the vagina. The female genital orifice occurs on the right side, somewhat below and behind the upper tentacle, close to the male orifice. In Succinea, therefore, we do not find a common genital cloaca or vestibule, as in Helix, but, as in Limnæa, the male and female genitalia have distinct external apertures

"The vas deferens descends along the coiled portion of the uterus and bears where the latter passes into the straightened portion, a rather large, laterally appressed gland—the prostate. The penis, which is provided with a single retractor muscle, is a thick-walled muscular simple tube. It is situate in front of the

vagina, and between them has the right upper tentacle, which winds around the penis and next proceeds backwards between the latter and the vagina. The outlet of the penis is at the side

but in front of that of the vagina

"In the distinct outlet of the exerctory ducts the generative organs in Successed present a condition resembling Liminal. The resemblance is nevertheless slight, to which no weight is to be attached in view of the undoubted close relationship between Succence and the HPLICIDE. In this respect I feel bound to follow Semper, but I am unable to agree with his opinion that the quadrate plate of the yaw found in Elasmognatha also occurs, only less strongly chitimized, in the Hericipa." (Thering)

411 Succinea indica, Pteiser.

Succinea irdica, Pfeiffer, P. Z. S. 1849, p. 133, ibid, Mon Helic. Viv. in, 1853, p. 8, ibid, Conch. Cab, Succinea, 1855, p. 45, pl. 4, figs. 39, 40, Reeve, Conch. Icon. xvii, 1872, Succinea, pl. 1, fig. 2. Hanley & Theobald, Conch. Ind. 1874, pl. 67, figs. 1, 4, Nevill Hand List, i, 1878, p. 212 Succinea (Tapada) indica, Pfeisser & Clessin, Nomencl Helic, Viv.

Original description - "S testr depresse oblonga, tenuissima, longitudinaliter plicatula, pellucida, pillide cornea; spira bresi, obtususcula; anfractibus vix 3, penultimo convexiusculo, ultimo I longitudinis aguinte, columella substricte fere ad basin recedente, superne calloso-marginata, apertura axi fere parallela, basi recedente, ovali-oblonga, angulata, intus mitidissima, peristomate acuto, margine deviro leviter arcuato

"Long 17, diam 7½, alt 6 mill, ap. 12 mill longs, infra medium 7 lata" (Pfeiffer)

Hab In lin · Blicemini (Pforffer); Srinuggar (Stolienta), Hima-

layas (Mus Cum); Kashnur (Thomson)

A thin and transparent species with a slender spire shells in the British Museum from the type locality are rather small and whitish corneous, while four, labelled Himalayas in the Cuming collection, are amber coloured Four unnamed specimens from Kashmir, in the British Museum, presented by Dr. J. Thomson, I also refer to S indica, but they only possess 21 whorls and measure 11 mm in diameter, while several shells collected by Stoliczka in the same country form part of the Beddome collection in the British Museum; one of these, possessing 24 whorls, measures · length 20, diam 9 mm

Jickeli records the species from the neighbourhood of the Mahmudi Canal, near Alexandria*, stating that his specimens differ from the Indian shell by their firmer texture, darker colour. and more slender form I have not seen the Egyptian shells, but to judge from the figures they appear quite distinct, not only

^{*} Nora Acta K Leop-Carol. Akad xxxvii, no 1, 1874, p 167, pl 6, fig II

being of more slender form but the spire is considerably shorter in proportion to the last whorl, which is also much more turned at the base and has the basal margin more truncate

442 Succinea plicata. Blanford.

Succinea plicata Blanford, J A S. B xxxiv, 1865, p. 80, Pfeiffer, Mon Helic Viv v 1868, p 29, Reeve, Conch Icon xviii, 1872, Succinea, pl 2, fig 11, Hanley & Theobald, Conch. Ind. 1874, pl 67, fig 8, Nevill, Hand List, 1, 1878, p 212
Succinea (Tapada) plicata, Pfeister & Clessin, Nomencl. Helic Viv. 1881, p 412

Original description: -- "Shell depressly subovate, very thin, irregularly, obliquely and more or less coarsely plaited, pale amber in colour, horny. Spire short; apex minutely papillar. Whorls 2½; the last about ½ of the entire length Aperture oblique. curved backwards at the base, nearly oval, openly angulate above, peristome simple; columellar margin regularly bow-shaped; right margin rather straighter.

"Length 17, diam. 9½ millim., height 6 millim. Aperture 14 millim long, 8 broad" (Blanford)

Hab. Burma Tongoop, Arakan, and south of Bassein, Pegu

(Blanford)

"This species approaches S semiserica, Gould, but is distinguished from that and from all other Indian species by its coarse sculpture. It has also a larger spire than S. sem-serica It is not common indeed species of the genus Succinea are generally but very locally distributed in India and Burma." (Blanford.)

Apparently a rare species not seen by me.

443 Succinea rutilans, Blanford.

Succinea rutilans, Blanford, J A S B xxxix, 1870, p. 23, pl 3, fig 23, Reeve, Conch. Icon xviii, 1872, Succinea, pl 2, fig 14, Hanley & Theobald, Conch Ind 1874, pl 67, fig 10, Pferfer, Mon Helic Viv vii 1876, p 37, Nevill, Hand List, 1,

1878, p 211
Succinea (Tapada) rutilins, Pfeiffer & Clessin, Nomencl Helic

Viv 1881, p 412

Original description —"Testa sub-ovata, tenuis, aurantiaca, striatula, nitidula, spira conoidea, apice sub-papillato, sutura impressa. Anfr $2\frac{1}{2}$, penultimus convexus, ultimus tumidus a longitudinis formans, basi rotundatus Apertura obliqua, ovata; peristoma rectum; columella regulariter arcuata, subsimplex Long $10\frac{1}{2}$, diam. $6\frac{1}{2}$, alt. $4\frac{1}{4}$, ap. long 8, lat. infra medium 5 mm" (Blanford.)

Hab India Cherra Poonjee, Assam (Godwin-Austen)

"A more regular ovate shell than S daucina, Pfr., which it otherwise resembles." (Blanford.)

440

Reeve indicates Calcutta as the habitat, but, as his localities are notoriously unreliable, this must be accepted under reservation

I have only seen three specimens from the Khasi Hills, which are in the Beddome collection

444 Succinea godivariana, sp. n

Shell minutely rimate, depressedly subovate, finely obliquely striated, pale greenish corneous. Spire very short, apex minutely papillate, suture deep. Whorls 21, tumid, the last equalling about 5 of the total length of the shell. Aperture oblique, obovate; peristome simple; columella slightly thickened and reflexed, covering the exceedingly minute umbilical slit, outer and basal margins regularly curved.



Fig 140 - Succince godivariana

Long 35, diam 25, alt 15 mm Apert. 25 mm long, 175 mm broad.

Type in Mr G C. Leman's collection

Hab India Gorge Hill, Godi'ari (Beddonie)

Seven unnamed specimens in the Beddoine collection—now in Mr Leman's possession—proved on examination to pertain to an undescribed form

The new apecies is the smallest Succinea known, and somewhat resembles a miniature S rutilans, but that species is twice as large and differs besides in colour.

445 Succiner collina, Hanley & Theobald

Succinea collina (Blanford MS), Hanley & Theobald, Conch Ind 1870, p 30, pl 68, figs 8, 9, var fig 10, Reeve, Conch Icon xviii, 1872, Succinea, pl 1, fig 1, Nevill, Hand List, 1, 1878, p 212, Blanford, J A S B xlix, 1880, p 200

"Testa conico-ovata, tenuiuscula, parum nitida, distincte atque flexuose striata, viridiscente-cornea Spira scalaris, apice acutiuscula, sutura valde impressa Anfr vix 3, perconvexi, ultimus la contrada subsecue de la contrada del contrada de la contrada del contrada de la contrada del contrada de la contrada del contrada de la contrada del contrada del contrada de la contrada de la contrada de la contrada del contrada

longitudinis subæquans Apertura ovata, obliqua, peristoma tenue, margine dextro mediocriter arcuato; columella arcuata, recedens, callosa

"Long 17, diam. 10, alt (v diam min) 6 mm., apertura 13 mm. longa, vix 9 lata" (Blanford.)

Var aurantiaca v. rufo-cornea

Hab India Western Ghats, Mahableshwar (Blanford), var. Torna Hills (Blanford), Pondicherri (Mus Cuming); Poona (Beddome Coll)

"Shell conically ovate, rather thin, but little polished, distinctly and flexuously striated, greenish horny in colour. Spire step-like, apex rather pointed, suture much impressed. Whorls scarcely 3, very convex, the last about \(\frac{3}{4}\) of the length. Aperture oval, oblique, peristoine thin, the right margin moderately curved forwards; the columella arcuate, receding, and covered with a thin callus. The largest shell I possess measures 20 mm in length. A rufous variety occurs at Torna Hill, near Sinhgarh, west of Poona.

"This is a rock-inhabiting species, found on cliffs and large blocks of basalt at Mahableshwar and Torna, and is allied to S. girnarica, a larger and thicker form, rather differently shaped, found by Mr. Theobald on the basaltic rocks of Girnar Hill, in Kattywar. The animal of S. collina bears a considerable external resemblance to that of the subgenus Lithotis, which has a similar habit The figures in the 'Conchologia Indica' give a fair idea of the species, but the spire in fig. 8 is rather too large." (Blanford)

Both S collina and S. girnarica are somewhat variable, and differ practically only by the former having a more slender spire, more distant and coarser stile—being almost ribbed in fact—and in being usually greenish corneous, but some shells in the Beddome collection, from the Bombay Ghats, are amber coloured;

they range from 13 to 16 mm in the greater diameter

The type, illustrated in Conch. Ind pl 68, figs 8 and 9, has been presented to the National Collection by Mr. Harvey, as well as the shell shown in fig. 10 on the same plate, from the type This latter form is very distinct, with very tumid whorls, and although it has a mature appearance it is composed of only 2½ whorls and has a diameter of 7.5 mm. On the other hand, three shells in the Theobald collection, also from Mahableshwar, measure 15 mm in diameter The Cuming collection contains three specimens from Pondicherri, labelled S rugosa, but they are not that species and, although a pale form. I refer them without hesitation to S. collina, they measure -16×10×6 mm The variety aurantiaça is also very distinct from the type in appearance, being of a dark amber colour; three specimens from the Bombay Ghats, in the Beddome collection, possessing three whorls, measure · length 19, diam. 11 mm. The same collection comprises some shells from Mahableshwar which are rather paler than the typical form and are in beautiful fresh condition, exhibiting some distant irregular spirals; they are also composed of three whorls, but measure length 24, diam. 15 mm., and are therefore considerably larger than the type.

446. Succinea girnarica. Theobald

Secence gernarica, Theobald, J A.S B xxviii, 1859, p 309, Pfeiffer, Mon Helic Viv v, 1868, p 29, Reeve, Conch Icon xviii, 1872, Succinea, pl 1, fig 5, Hanley & Theobald, Conch Ind 1874, pl 67, figs. 5, 6, Nevill, Hand List, 1, 1878, p 212 Succinea (Tapada) girnarica, Pfeiffer & Clessin, Nomenci Helic Viv 1881, p 412

Original description -"Testa oblongo-ovata, solida, non polita, tumida, fortiter striata, rubro flavescente magis minusve rutilo. aliquando pallescenti; anfract 21 rapidissimo crescentibus, ultimo capacissimo Apertura rotundata Perist tenui

"Diam 1 07 [=27 mm], 0 61 [=15 25 mm.]; alt 0 42 poll. [=0 5 mm]" (Theobald.)

Hab India. Girnar Hills, Kattywar (Theobald, Foote)

"Few specimens attain the dimensions here given. The largest shells are found on the peaks of the eastern portion of the Girnar Hills, and at a lower elevation of about 2000 feet the shells are much smaller and paler coloured." (Theolald)

Generally speaking, S girnarica may be readily distinguished from S collina by its larger size, its bright amber colour, sometimes shading to pink, by the more rapidly increasing whorls and the

consequently more dilated aperture

Three shells in the Theobald collection range in size between 27 and 18 mm, although they all possess 21 whorls, while three in the Cuming collection measure 19 mm a 1 have the last whorl tinted with a pink hue outside. All these are from Girnar Hill The specimen figured in Conch Ind has been presented to the British Museum by Mr Harvey, it measures 23 5 mm, although the line, indicating its size, on the plate is only 21 mm Blanford collection contains specimens collected in the type locality by Foote; they measure 15×11×65 mm

Var viridescens, nov

Two shells of unknown origin in the British Museum, labelled "highest pinnacle of Mt Girnar" are sufficiently distinct from the type to rank as a variety. They are of a very pale greenish corneous colour, and measure: major diam. 16, minor 10, alt 6 mm The Blanford collection also comprises two specimens from Katiywar

447 Succinea rugosa, Pfaffer.

Successed rugosa, Pfeisfer, Symb Hist Helic. 11, 1842, p. 58, 1bid, Mon Helic Viv 11, 1848, p. 517, 1bid Conch-Cab, Successed, 1855, p. 53, pl. 5, hgs 38, 37 Succinea (Brachyspira) rugosa, Pfeiffer & Clessin, Nomenci Helic Viv 1881, p 410

Original description - "T ovato-ventricosa, tenni, oblique 202

rugosa, nitide fulvescente, spira bievissima, anfr 2½, ultimo inflato, apertura ovali, margine sinistio valde aicuato, perist simplice, membianaceo

"Long. 14, diam 10 mill" (Pfeiffer) Hab. India Pondicherri (Guérin).

Only known from the description and figure I have not seen any shells which can be referred to this species

448. Succinea semiserica. Gould

Succinea semiserica, Gould, Pioc Boston Soc Nat Hist ii, 1846, p 100, Pieifier, Mon Helic Viv iii, 1853, p 10, iv, 1859, p 805, Gould, Otia Conch 1862. p 199, Hanley & Theobald, Conch Ind 1874, pl 67, figs 2, 3 Nevill, Hand List, i, 1878,

Succinea semisericea, Reeve, Conch Icon aviii, 1872, Succinea, pl 2, fig 9

Succinea (Brachyspira) semiserica, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 410

Original description .—" Testa fragilis, ovalis, a tergo depressa, postice straminea, antice albido-sericea, longitudinaliter plicosostriata; aufr 2½, ultimo maximo, apertura ovata, patula, faciem inferiorum fere adequante.

"Long. $\frac{1}{2}$ [=12 75 mm.]; lat $\frac{3}{10}$ [=76 mm], alt $\frac{3}{20}$ poll [=38 mm]" (Gould)

Hab Burma. Tavoy (Gould), Rangoon, Moulman (Stoliczka):

Chittagong (Raban), Pegu (Theobald), Mergui (Mus. Brit)

"Its shape is like S tigrina, Fér., and it is well characterized by the peculiar silky-white or pearly surface of the anterior half of the shell " (Gould)

Nevill considered S plicata, Blanford, and perhaps S bacon, Pfeiffer, cospecific with semiserica The three forms are, however, quite distinct The present species has an extremely short spile and is finely, distantly ribbed Owing to a deficiency of calcareous matter the shell is very brittle This applies especially to some shells from Rangoon, in the Theobald collection, which are labelled S. 1 anyoonenss-a name never published-but which pertain to the present species; they are extremely thin, almost transparent, and of a fuscous corneous colour Their dimensions exceed those given by Gould, i c 15×9×3 Three specimens from Pegu, in the Theobald collection, are pale greenish corneous. The Cuming collection comprises shells from Tavoy measuring 14×8×35 mm, which therefore also exceed Gould's type in size; on the other hand, there are specimens from Mergui in the general collection of the British Museum which attain a size only of $8 \times 45 \times 2$ mm.

449. Succinea baconi, Pfeiffer

Succinea baconi, Pfeiffer, P Z S 1854, p 298, ibid, Mon Helic Viv iv, 1859, p 804, Reeve, Conch Icon xvin, 1872, Succinca, SUCCINEA 453

pl 1, fig 6, Hanley & Theobald, Conch Ind 1874, pl 68, figs 1, 4, Nevill, Hand List, 1, 1878, p 214
Succinea (Brachyspira) bacom, Pfeiffer & Clessin, Nomencl Helic Viv. 1881, p 410

Original description.—"S testa semiovato-acuminata, tenussima, longitudinaliter subundulato-plicata, pellucida, nitida, pallide cornea, spīra parvula, submucronata; anfract 2 cum apiculo punctiformi, penultimo convexo, ultimo 3 longitudinis formante, basi subattenuato, columella filosa, superne subplicata, apertura obliqua, subregulariter acuminato-ovali, non incumbente, perist simplice, margine dextro antroi sum arcuato

"Long 15, lat 10, alt 6 mill" (Benson)

Hab India Calcutta (Bacon), South Canara (Beddome)

Of this species I have seen two specimens in the Cuming collection, bearing Pfeisfer's own label S bacom is very fragile and thin, whitish corneous, and may be regarded as intermediate in character between S semiserica and S daucina, but some specimens in the Blanford collection are somewhat amber coloured and, although possessing 21 whorls, only measure length 14, diam 9 mm. In the Beddome collection are some shells from South Canara

450 Succinea daucina, Pfeiffer.

Succinea daucina, Pfeiffer, P Z S 1854, p 298, ibid, Mon Helic Viv iv, 1859, p 810, Reeve, Conch Icon xviii, 1872, Succinea, pl 3, fig 19, Hanley & Theobald, Conch Ind 1874, pl 67, fig 7, Nevill, Hand List, i, 1878, p 212
Succinea (Tapada) daucina, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 412

Original description — "S testa ovato-conica, solidula, leviter striatula, oleoso-micante, lutescenti-rubella, spira conica, apice subpapillata, anfract 3, penultimo convexo, ultimo 3 longitudinis formante, basi parum attenuato, columella filari, leviter arcuata; apertura obliqua, incumbente acuminato-ovali, basi lata, perist simplice, marginibus subsymmetricis

"Long 92, lat 6, alt 41 mill" (Pfeiffer)

Hab India Colcutta (Bacon); Port Canning (Nevill)

The present species is readily distinguished from its nearest allies by the slightly inflexed outer margin of the peristome. In the Cuming collection are four shells, labelled by Pfeiffer himself, none of which, however, exceeds 9 mm in diameter. The specimen figured by Hanley and Theobald has been presented to the National Collection by Mr. Harvey.

451 Succinea crassinuclea, Pfeiffer

Succinea crassinuclea (Benson), Pferster, Zerts Malak vi, 1849, p 110

Succinea crassiweula, Pfeisier, Mon Helic Viv in, 1853, p 9, Reeve, Conch Icon viii, 1872, Succinea, pl 1, fig 4, Hanley

& Theobald, Conch Ind 1874, pl 68, figs 5, 6, Nevill, Hand List, 1, 1878, p 212. Succinea (Tapada) ciassiuscula, Pfeisser & Clessin, Nomenci Helic Viv. 1881. p 412

Original description .- "T. ovato-conica, solida, striata, punctis impressis notata, vix nitidula, corneo-albida; spira scalaris, papillata; anfr. 3, penultimus perconvexis, ultimus inflatus, rotundatus, ? longitudinis aequans; columella subcallosa, arcuaim recedens; apertura lata, ovalis, intus margaritacea; perist. simplex, obtusum, margine dextro regulariter arcuato.

"Long. 9. diam 7. alt. 4 mill. Apert 61 mill longa. 41 lata"

(Pfeiffer.)

Hab. India: Bundelkhund (Theobald); Calcutta and Port

Canning (Nevill): Salt Range and Kutch (Stoliczka)

The species was originally published as S. crassinuclea, from a Cuming label, but four years later Pfeiffer altered it to crassiuscula. as communicated to him in a letter by Benson, and the latter name has been adopted by every subsequent author dealing with the

species.

The shell is of a delicate whitish corneous appearance and more or less connects S daucina with S. vitrea. I have seen several specimens which exceed the type in diameter, one in the Cuming collection and four, presented to the National collection by Hutton, measuring 10 mm, while the Theobald collection contains shells which even attain 11 and 125 mm. in diameter On the other hand, specimens presented by Colonel Wilmer, who collected them at Fort William, Calcutta. although full-grown, only measure 6.5 mm.

452 Succinea vitrea, Pfaffer.

Succinea vitrea, Pfeiffer, P Z S 1854, p 298. ibid, Mon Helic. Viv. iv, 1859, p 810, Reeve, Conch Icon. xviii, 1872, Succinea, pl. 3 fig 20, Hanley & Theobald, Conch Ind 1874, pl. 68, figs 2, 3: Nevill, Hand List, 1, 1878, p 214, Smith, Fauna and Geogr Maldive & Laccadive Arch 1, part 2, 1902, p. 142; Peile, Journ. Bombay Nat Hist Soc xi, 1908, p. 131 Succinea (Tapada) vitrea, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 412

Original description: - 'S. testa ovato-conica, tenuiuscula, confertim plicato-striata, mitida, albo-hyalina; spira conica, subpapillata; anfr. 3 convexis, ultimo 3 longitudinis formante, inflato, basi attenuato; columella filosa, arcuata; apertura parum obliqua, incumbente, ovali, superne vix angulata; perist simplice, marginibus callo opaco junctis, subsymmetricis.

"Long. 12, lat. 8, alt. 5 mill." (Pfeiffer.)

Hab. India: Calcutta (Bacon); Fort William, Calcutta (Wilmer); Bombay Island (Peile). Andaman Islands, Fort William (Wilmer). Laccadive Archipelago (Stanley Gardiner Expedition)
Mr. Smith considers this species "scarcely separable from

S. crassiuscula, Benson. It certainly a; proaches that species in several respects, but the last whorl does not increase so rapidly

and the spire is more produced

Several specimens from Bombay measure 135 mm. in diameter thus exceeding the type which is in the Cuming collection. Three shells from Calcutta in the Theobald collection also have a diameter of 13 mm. On the other hand three specimens in the British Museum collected in 1880 by Col. Wilmer on brickwork at Fort Wilham, Andaman Islands, which I refer to this species, do not exceed 9 mm and a still smaller form, collected by him at Fort Wilham, Calcutta, only measure 65 mm. The shells collected by the Stanley Gardiner Expedition, in the Maldive group—which are also in the British Museum—belong to a rather slender form, pale greenish corneous, and almost transparent.

453. Succinea hanleyi, sp. n

Succinea subgrancea Hanley & Theobald, Conch. Ind. 1876, pl. 158, fig 9 (non Pfeiffer)

Shell imperforate, elongate-conoid, finely and closely, somewhat irregularly, plicate-striate, pale amber coloured. Spire elongate, apex minutely papillate, suture moderately deep. Whorls 3½, rather tumid, the last about 4 of the total length of the shell. Aperture oblique, obovate, the margins slightly thickened. columellar margin shortly reflexed, with a slight elongate tubercle at the junction with the basal margin.

Long. 7, dam 4, alt 35 mm.; apert. 4 mm long, 3 mm.

broad.

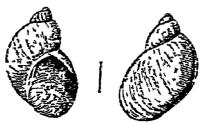


Fig 141.—Succirca rentega

Hab India: Calcutta

Type in the British Museum.

The British Museum contains four specimens from Calcutta labelled Succinea subgranosa, but which differ from that species by the more slender spire and in being of a pale amber colour. The new species has also some relationship with S bensoni, but the aperture is less high in proportion to the spire. One of the specimens has 3½ whorls completed and measures nearly 8 mm. in length. The shell figured in Conch. Ind. I also refer here

reaching nearly to the lower margin of the tooth, the side cusps being subobsolete The lateral teeth are like the centrals but unsymmetrical The marginal teeth are about as wide as high. with one stout, pointed inner cusp, and two short side cusps"

The genus is confined to Central India, and only two species are Although Blantord only regarded it as a subgenus of Successed, I consider; apart from the totally different build of the shell, the presence of an internal furrow for a siphon sufficient warrant to rank it as a separate genus, as was done by Fischer.

457. Lithotis rupicola. Blanford

Succinea (Lithotis) rupicola, Blanford, A. M. N. H. ser. 3, xii, 1863, p. 186, pl. 4, figs. 8-10, Nevill, Hand List, 1, 1878, p. 214

Succinea rupicola, Pfeiffer, Novit Conch. ser. 1, 1v, 1871, p 11,

pl. 112, figs 1-4, 1bid, Mon Helic. Viv vii, 1876, p 35

Lithotis rupicola, Bland & Binney, Ann Lyc Nat Hist New York, x, 1874, p 349 (jaw and lingual dentition, description), Binney, Proc Acad Nat Sci Philadelphia, 1874, p 54, pl 5, figs 3-6 (jaw and lingual dentition, figures), Hanley & Theo-bald, Conch Ind 1874, pl 81, fig. 7, Pfeiffer & Clessin, Nomencl. Helic Viv. 1881, p 231, Tryon, Struct Syst Conch in, 1884, p 88, pl 100, fig 40.

Original description - "Testa ovata, pertenuis, succinea, curvate costulato-striata, spira plana, sutura vix depressa; anfractibus 11, ultimo prope aperturam descendente; carina ex apice oriens, spiralis, peristomatis ad marginem dextrum, 2 mm. a sutura, desinens, apertura permagna, ovata, continua, intus politissima, nitida, peristomate tenue, rectum, margine columelları callose appresso.

"Diam maj 7 mill., min 5, alt $2\frac{1}{2}$ " (Blanford)
Hab. India Western Ghats; Khandala (Blanford)

"Combines the characters of Camptonya and Otina, belonging to the Auriculacea, with those of Succinea and its allies. From the shell alone, which has the form of Otina, with the substance, texture, and peculiar external ridge and internal furrow of Camptonya, I should have supposed the present species to belong to the last named genus, but the retractile eye-bearing peduncles prove its place to be in the neighbourhood of Succinea, from which genus the internal furrow for a siphon distinguishes it as a wellmarked subgenus Tentacles are extremely small and rudimentary in several of the subgenera of Succinea, and, in the present case, appear to be wanting, if present, they are certainly very incon-The animal of Helisiga, Less, as represented in Adams, Gen Rec Moll pl 73, closely resembles that of Lithotis, but has a larger foot, while the shell only differs in the absence of the siphonal furrow

" Lithous abounds adhering to the precipitous basaltic rocks of the

LITHOTIS 459

Western Ghats, like Cremobates, but apparently in more exposed situations, being perhaps more purely an air-breather, and requiring less moisture than its congener. Both probably feed upon the conferroid vegetation covering the surface of the rocks to which

they adhere " (Blanford)

Four shells from Bhor Ghat, presented by A A West to the National Collection, only measure 6.25 min in diameter, but three specimens from Khandala, near Bombay, presented by Dr. A. H. Leith, are considerably larger than the type, their dimensions being $9 \times 6.5 \times 3.5$ min. The same measurements are attained by four shells from Sinhgarh Hill, Poona, in the Theobald collection

A very depressed form without any spire, a feature by which it principally differs from L tumida

458 Lithotis tumida, Blanford

Succinea (Lithetis) tumida, Blanford, J A S B. xxxix, 1870, p 23, pl 3, fig. 24, Nevill, Hand List, 1, 1878, p 214
Succinea tumida, Pfeiffer, Novit Conch ser 1, iv, 1871, p 12, pl 112, figs 6-7, ibid, Mon Helic Viv vii, 1876, p 35
Lithotis tumida, Hanley & Theobald, Conch Ind 1874, pl 81, figs 8, 9, Pfeiffer & Clessin, Nomencl Helic Viv 1881, p 231

Original description.—"Testa ovata, oblique elliptica, tenuis, rubello-cornea, parum nitida, oblique striata, spira brevi; apice papillari; sutura profunda Anfr 2-2½ tumidi, lira infra-suturali obtusa, antice in exemplis veteribus aliquando fere obsolescenti Apertura obliqua, magna, ovalis, postice non angulata, peristoma tenue, rectum, continuum, margine columellari tenuiter calloso, appresso

"Long 62, diam 5, alt 3, ap long 53, diam vix 4 millim."

(Blanford)

Hab India . Sinhgarh, Poona (Blanford)

"This is a second species of the remarkable sub genus Lithotis, much more turned than the type Succinea (Lithotis) rupicola, and with a proportionally more developed spire; it serves to connect that form with the typical rock inhabiting Succineæ of Western India, such as S girnarica, Theobald, and a new species from Mahableshwar, the animal of which is very similar to that of Lithotis

"The specimens figured are not the largest that have been found. Major Evezard possesses shells from Poorundhur measuring 9 millimetres in length, 6 in diameter, and 4 in height (when laid with the aperture downwards). In these the sculpture is much less regular and weaker than in the accompanying figure which represents a young specimen. The largest Singhur [Sinhgarh] specimen in the same collection measures 8, 6, and 3½ millimetres in its three dimensions, the aperture being 6 mill by 4" (Blanford.)

Var subcostulata, Blanford

Blanford, tom cit., p 23, Pfersfer, Novit Conch ser 1, iv, 1871, p 13, pl 112, fig 5, Theobald, Cat Land and Freshw Shells Brit India, 1876, p 32

"Costulato-striata, lira infra-suturali validiori" (Blanford)
Hab India Poorundhur.

Differs from L rupicola principally by the raised spire, but the

siphonal furrow is less pronounced than in its ally

The British Museum contains three specimens from the collection of H Adams, which are smaller than the type, since they only measure $5 \times 3.75 \times 1.75$ mm. On the other hand, four shells in the Cuming collection, without indication of habitat, are 7 mm. in length.

Genus CAMPTOCERAS, Benson.

Camptocer as, Benson, Calcutta Journ Nat Hist in, 1843, p 465, A M N H ser 2, xv, 1855, p 10, Adams, Gen Rec Moll ii, 1855, p 258, Godwin-Austen, Quait Journ Geol Soc London, xxxiii, 1882, p 220, Fischer, Man Conchyl, 1883, p 511

IYPE, C. terebra, Benson.

Range · India

Shell sinistral, imperforate, elongate-elliptic, spire solute, appearsomewhat acute, suture widely and deeply excavated. Whorls 3-4, narrow, elongated, keeled above and below, flattened, apical whorl elongate-acuminate, exserted. Aperture solute, entire, large, not equalling the spire, elongate-elliptic, narrow above, arcuately angulated above and below. Peristome acute

Animal with two filiform, obtuse tentacles. Eves large, placed between the tentacles. Mantle not extending beyond the lips of the shell. Foot short, scarcely exceeding the length of the

aperture

Anatomy unknown.

Considerable difference of opinion appears to exist legalding the systematic position of this genus. Benson considered it to be intermediate between Limnæa and Ancylus, while Nevill was convinced, from the recorded habitat, as well as from the characters of the shell itself, that it would prove to be a sinistral form, closely allied to Succinea. Chenu and Fischer, on the other hand, placed it near Physa. The animal unfortunately has never been examined anatomically, and the point can consequently not be definitely settled. I am inclined to favour Nevill's views and therefore retain it in the family Succineids.

In 1882 Lieut-Colonel Godwin-Austen referred a fossil form from the Eccene, found at Sheerness, to the present genus. The prece of rock containing these fossils, several in number, now

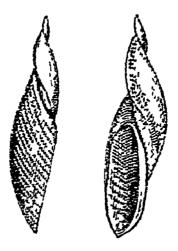
^{*} Camptoceras prescum, Quart Journ Geol Soc London, xxxviii, 1882, p 220 pl 5, figs 1-5, and var obtusum, pl 5, figs 6, 7

being in the British Museum. I have been able to subject them to a careful scrutiny, and I must admit a remarkable resemblance between the two Indian species—C. terebra and C austeni—and the British fossil form. Whether this is simply a case of convergence or actual affinity can of course never be determined. In spite of the weight of opinion—that of Dr. Henry Woodward as well as Godwin-Austins—in favour of the latter, I am inclined to attribute it to the former.

459. Camptoceras terebra Benson

Camptoceras terebra, Benson Calcutta Journ. Nat. Hist. iii, 1843, p 465 ibid., A. M N H. ser 2, xv, 1855, p. 10, text-fig.: Adams, Gen. Rec. Moll ii, 1855, p 258, pl. 84. fig 1; Chenu, Man. Conchyl i, 1860, p. 481, fig. 3544; H. F Blanford, J. A. S B xl, 1871 pp 39, 40, pl. 2, fig. 1; Hanley & Theobold, Conch Ind 1876, pl 158, figs. 1, 2; Godwin-Austen, Quart. Journ. Geol. Soc. London, xxxviii, 1882, pl. 5, fig. 8; Fischer Man. Conchyl. 1883, p 511. Tryon Struct. Syst. Conch. ii, 1884, p 104, pl. 100, fig 35, Cooke, Cambridge Nat. Hist. ii. 1895, p 302, fig 202 B

Original description:—"Testa diaphana. elongata, anfractibus tribus compressis, biangulatis, transverse striolatis, lineis longitudinalibus depressis decussatis. Animali fuscato, versus spiram rubescente" (Benson.)



× 10

Fig 142.—Camploceras terebra. (Copied from J. A. S B)

This short description was subsequently amended by Benson in 1855, in the 'Annals and Magazine of Natural History,' as follows.—"Testa elongato-elliptica, hyalina vel albido-cornea, lineis spiralibus exiguis, vix elevatis, striis obliquis confertissime

decussatis; apertura verticali, elliptica; peristomate acuto, vix expansiuscula.

"Long. vix 9, pierumque 6 ad 7 mill Diam 3 mill longa, apeit exempl majoris 4 mill"

Hab India Moradabad, Rohilkhund (Bacon)

"Animal. Tentaculis duobus filiformibus, obtusis, oculis majoris inter tentacula sitis, proboscideque mediocri munitum; pallio labia testæ haud transeunte, pede brevi, longitudinem

aperturæ vix superante

"The form of the tentacles and the position of the eyes, situated between the filiform tentacles and sessile on the head (not as in Lymnæa occupying the fore part of the widened base of the triangular tentacles) at once distinguishes the animal from that of Lymnæa. In Camptoceras the eyes are large in proportion to the size of the animal. Shell very local" (Benson.)

Although the species appeared to be sufficiently plentiful when first found—some forty specimens being taken by Bacon and Benson—their subsequent searches for it proved fruitless, and it is apparently rare in collections. I have not seen the species

460. Camptoceras austeni, H F. Blanford.

Camptoceras austeni, H. F. Blanford, J. A. S. B. 1, 1871, p. 40, pl. 2, fig. 2, Hanley & Theobald, Conch. Ind. 1876, pl. 158, figs. 3, 4, Nevill, Hand. List, i, 1878, p. 215, Godwin-Austen, Quart. Journ. Geol. Soc. London, xxxviii, 1882, pl. 5, fig. 9

Original description — "Testa sinistrorsa, elongato, albido-cornea, epidermide tenui induta, striis spiralibus et transversis minutissime obliquiter decussata. Spira elongato acuminata Apex acutius-culus Anfractus 2, soluti Apertura subobliqua, regulariter ovalis, superne haud complanata Peristoma integrum, continuuni, fusco-marginatum

"Alt 375, diam. 1 mm. Aperturæ alt 16, diam 09 mm"

Hab India: Nazirpur, Mymensing Prov, Dacca (Godwin-

Austen)

"In form this species closely resembles C. terebra, Bens, but is distinguished by its much smaller size, the smaller number of its whorls, and especially the regular oval form of its aperture; that of C terebra being much flattened on the inner upper margin. Other differences are presented by the specimen of the latter species here figured and which I received some years since from the late Mr. Benson. The aperture of C terebra is equal to more than half the length of the shell, while that of C austeni is less than half the same length; the proportions in the former case, as determined by accurate measurement, being 53 per cent., in the latter 42 per cent. My specimen of C terebra is probably not full-grown, since it has but $2\frac{1}{2}$ whorls, and the margin of the peristome is sharp, unlike that of the specimens both of C austeniand the following species. All the specimens of these exhibit a

thickening of the epidermis around the peristome, which I consider characteristic of the full-grown shell *C. austeni* would appear to be rare at the locality, since only five specimens were found among a large number of the following species. It is possible, however, that it may have been overlooked, owing to its smallness " (H. F. Blanford)

smallness " (H. F. Blanford)

Both this species and C lineatum were found together by
Lieut.-Col Godwin-Austen, adhering to plants in a dried-up

lake

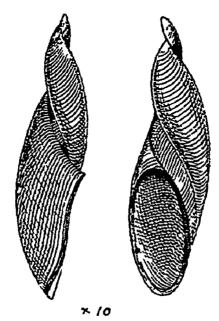


Fig 143 — Camptoceras austeni. (Copied from J. A. S. B.)

A specimen, presented in 1909 by the late W. T. Blanford to the British Museum, is from the original locality, but as it only measures 3×0.75 mm it cannot be the type. The same remark applies to a shell in the Godwin-Austen collection (British Museum), which, although labelled type, only measures 3 mm in length. A second shell, which only attains 2.4 mm in length, is provided with an epiphragm, a fact which confirms my surmise that Camptoceras is a genus of land mollusca.

461 Camptoceras lineatum, H. F. Blanford.

Camptoceras plineatum, H. F. Blanford, J. A. S. B. xl, 1871, p. 40 pl. 2, fig. 3
Camptoceras lineata, Hanley & Theobald, Conch. Ind. 1876, pl. 158, figs. 5, 6
Camptoceras lineatus, Nevill, Hand List, 1, 1878, p. 215

Orumal description, - "Testa elongato-ovata, sinistrorsa, albido cornea, epiderinide tenui induta, lineis elevatis, fuscis, mandistantibus, spiralibus oi nata; interspatiis minute decussatis. Spira valde exserta Apex acutiusculus Anfractus 21, approximati. attingentes, ultimus pone aperturam omnino solutus. subobliqua, ovalis, superne subcomplanata Peristoma continuum, integrum, fusco-marginatum

"Alt. 4.5 mm; diam 23 mm. Apertura alt. 35, lat 17 mm" (H. F Blanford)

Nazirpur, Mymensing Prov., Dacca (Godina Hab. India

Austen)

"It is not with entire confidence that (not having seen the ammal) I attribute this species to the genus Camptoceras, since it differs from the typical species in having the whorls contiguous. except behind the peristome. In most specimens that I have examined, little more than the peristome is free, but in one or

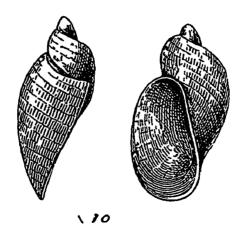


Fig 144 — Camplocer as lineatum (Copied from J A S B)

two, at least a quarter of the last whorl is not in contact with the penultimate whorl, as may be seen if the shell be held up to the light or over a sheet of white paper in a proper position. The character of the peristome and of the shell surface closely resemble those of the more typical species of Camptoceras, and that the habits of the animal are similar may be inferred from its association with the preceding species [C austeni] As far as can be judged, therefore, the evidence is preponderant in favour of this generic alliance I have adopted Perhaps it may not be irrelevant to add that no species of Physa has yet been discovered in India" (H. F. Blanford)

Two shells from the original locality, in the Godwin-Austen collection (British Museum), are marked "type" One of these shows the remains of an epiphragm. Three other shells only

measure 24×15 mm One of these has the second whorl solute

I found a series of twelve specimens from the original locality in the British Museum, presented in 1909 by the late W T Blanford The largest of these only measures 3.5×2 mm, and

is therefore smaller than the type

The species is included in Camptoceras with some doubt, it differs considerably in several characters from the other two known species. Benson himself had some misgivings on the subject. I do not, however, think it advisable, without anatomical data to guide us, to establish a separate genus

Genus CAMPTONYX, Benson.

Camptonys, Benson, A. M. N. H. ser. 3, 1, 1858, p. 336, pl. 12, figs. 1-6 (shell and animal), fig. 7 (jaw and radula), Stabile, Atti Soc. Sci. Nat. Milano, vii, 1864, p. 122, Nevill, Hand Liet, 1, 1878, p. 215, Blanford, J. A. S. B. xlix, 1880, p. 200, footnote, Fischer, Man. Conchyl. 1883, p. 502. Tate, in Woodward, Man. Moll. appendix, 1890, p. 43, Cooke, Cambridge Nat. Hist. iii, 1895, pp. 302, 438

Trpe, C theobalds, Benson

Range India

Shell pileiform, obliquely conical, reddish brown; apex subspiral, free, obliquely incurved, turned towards the right side, whorls 1½, the last almost constituting the entire shell, a dorsal rib, resembling an obtuse subspiral keel and corresponding interiorly to a siphonal furrow, runs from the apex to the right margin, aperture large, symmetrical, regularly ovate, margins

expanded

Fischer in 1858* united Camptonya with Valenciennesia, a genus of fossil species occurring in Miocene beds in the Crimea, Turkey, Roumania, Croatia, Slavonia, and Hungary, but subsequently in his "Manuel" he modified his views so far as to separate the two, although still regarding them as closely allied With all due deference to so eminent an authority, I am unable to concur in his view, for, although undoubtedly having some features in common, the mere fact of Camptonyr being furnished with a spirally convoluted apex, while Valenciennesia has a non-spiral apex, apart from the enormous difference in size, militates against the assumption of close affinity

462 Camptonyx theobalds, Benson

Campionyx theobalds, Benson, A M N II ser 3, i, 1858, p 336, pl 12, figs. 1-6 (shell and animal), fig 7 (jaw and radula), Adams, Gen Rec Moll 11, 1858, p 644, pl 138, fig 10, Hanley

& Theobald, Conch Ind 1874, pl 81, figs 5, 6, Tryon, Struct. Syst Conch in, 1884, p 98, pl 103, fig. 4, Nevill, Hand List, i, 1878, p 215, Tate in Woodward, Man Moll 1890, appendix, p 43, Cooke, Cambridge Nat Hist in, 1895, p 302, fig 202 c Valenciennesia theobaldi, Fischer, Journ Conchyl, vii, 1858, p 319

Original description:—"Testa (supina) cornucopiam simulante, tenui, concentrice rugosa, purpureo-fusca, dorso ad latus sinistrum compressiusculo, costa carinæformi subspirali, sulco postico adjecto, ab apice usque ad marginem dextrum aperturæ descendente, apice obtuso; apertura ovali, intus purpureo-lutescente, nitida, peristomate acuto

"Long 10, diam dorsali 41 mill.; apert. 8 mill longa, 6 lata."

(Benson)

Hab India Girnar Hills, Peninsula Guzerat (Theobald).

"This singular shell, sent to me by Mr W. Theobald, Jr, as a cap-shaped Succinea, was found by him in abundance on the central peak of Mount Girnar in Kattiwar, on the peninsula which separates the Gulfs of Cutch and Cambay. He states that these hills form an amphitheatre, with a central crateriform clump, the peak rising to an altitude of 2500 feet.

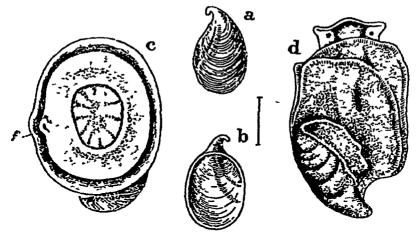


Fig. 145 — Camptonyx theobalds (all enlarged)
(Copied from J. S. B.)

"A piece of the weathered rock forwarded by him contains in a space of 2 inches square twenty-six young individuals, adhering most tenaciously to the surface like limpets or Ancyli" (Benson)

Benson thought it probable "that Camptonyx holds an intermediate place between Testacella, Plectrophorus, and Succinea, and that it bears the same relation to the latter that Ancylus does (through the intermediate Indian genus Camptoceras) to Lymnaa

"The external rib and furrow on the shell have a corresponding depression and ridge internally, but they are less strongly marked In the animal the sole is oblong, of a pale colour, transversely

corrugated, and surrounded on all sides by a thick greyish hyaline mantle, which completely hides the sole during estivation, exuding

a gluten, most tenacious when dried.

"Mr Theobald was doubtless justified, by the situation in which he found his specimens, on a high peak, where the drought at the time of his visit had driven the largest example of a gigantic Succinea into maccessible crevices in the rock, in attributing terrestrial habits to the animal"

Mr S P Woodward writes (l c. p. 339)—"The respiratory orifice is quite on the edge of the mantle. The tentacles are rather conical than angular, and the mouth appears to me rather peculiar, unlike Physa and Lymnaa. The upper mandible is conspicuous, slightly lobed, but destitute of the ridges seen in the Hillicide and of the lateral elements which are added in Lymnaa. The lingual ribbon is 036 long and 011 wide with 86 rows of teeth, 87 in a row $\frac{43 \cdot 1.43}{60}$; they have simple obtuse hooks, as in Ancylus; the central row only differs in being symmetrical, the laterals diminish gradually from the 14th to the 43rd, and a second (outer) cusp makes its appearance, and increases until the three near the margin are regularly bicuspid. The tongue is more like Ancylus than any other, but differs from it in the absence of those unarmed marginal plates which give a peculiar appearance to the lingual ribbon of Ancylus and are still more conspicuous in Felletia."

The British Museum contains five specimens, labelled "Kattiwar," the largest of which measures long. 65, alt. 25 mm, apert 55×425 mm. The shell figured in Conch. Ind. is also in the British Museum, having been presented, together with two others, by Mr. Harvey.

SLUGS.

It has been found convenient to deal with the land slugs collectively. For their systematic position reference should be made to the systematic, index at the commencement of this volume.

Family ARIONIDÆ.

Subfamily ARIONINÆ.

Genus ANADENUS, Heynemann.

Anadenus, Heynemann, Malak Blätt x, 1863, p. 138, Godwin-Austen, Moll India, i, 1882, p. 46

Original description (in German) — "Anadenus (without tail gland). Body fused with the sole for the whole length Mantle covering the anterior part of the body. Respiratory orifice placed behind the middle of the right side of the mantle Genital orifice behind the right upper tentacle. Two upper and two lower retractile tentacles Back flatly convex (without keel, without tail-gland) Sole tripartite Jaw with close transverse ribbing. The curve of the transverse rows of the radula practically in a plane. Tooth-plates rectangular with projecting sides Central tooth unilateral, triangular with lateral spines. Laterals scarcely differing from central, with a lateral spine on the outer side. Internal shell present, white, calcareous, without epidermis on the margin. Nucleus lateral.

"The animal superficially resembles our German Arions and Limaces. It is related to Arion, but only resembles Limax Its relationship with Arion is established by the jaw which has transverse ribs as in Arion empiricorum. On the other hand

it differs in the following particulars:-

Arion

Caudal gland · present
Respiratory ornice in front of
middle of the mantle.
Internal shell · absent.
(the mantle contains only
scattered calcareous particles)

Anadenus.

absent placed further back

present, with distinct growth-

"The principal character in which Anadenus differs from Arion is the absence of the caudal gland; somewhat less weight must

be attributed to the situation of the lung-orifice, as this has not been observed in living specimens. In dead examples of Anadenus it is indeed practically in the middle, but the anterior, free, part of the mantle invariably contracts far more than the posterior adherent portion, and since in dead specimens of Limax, this opening is likewise in the middle while in the living state it is placed further back, it is not likely to be different in Anadenus

"The new genus is probably nearest to Geomalacus occurring in Great Britain, which hitherto I have not had an opportunity of examining, but from which it may be distinguished by the

following characters .-

Geomalacus

Fail po-tion, round.
Respiratory orifice: at the middle of the mintle

Caudal gland present.
Internal shell absent.

Anadenus

pointed behind the middle

absent

"Although similar, not only in general form, but also as regards the position of the respiratory and genital orifices, as well as in the presence of an internal shell, it must not be confounded with Limax, for in addition to the difference in the jaw, it is distinguished by the form of the tail portion which, in Limax, is invariably keeled while in Anadenus it is without any trace of keel

"If we could only observe living specimens or obtain an accurate description of them, undoubtedly further differentiating characters between similar or allied forms would be found, such as the shape

of the rugge of the mantle and of the body.

"As I have already observed on a former occasion, in dead specimens the wave-like rings on the mantle of Limax disappear. Nor can it be stated whether the mantle of Anadenus is granulated as in Arion, Amalia, and Geomalacus, or whether it has the well-known structure of Limax The rugge on the back likewise become depressed and no accurate description of them can be made from spirit-specimens; yet, it is evident from the illustration, which I give of the skin of the back of a dead Anadenus, that it really differs from all known forms. A furrow runs along the middle of the back, from which lateral furrows, obliquely directed backwards, branch off. The areas enclosed by these furrows are covered with a double row of irregularly diverging rugge."

The only extralimital species known is A sinensis, Mollendorff *.

from Se-Chuen.

^{*} Ann Mus Zool Acad Imp Sc: St Petersburg, iv, 1899, p. 49

463 Anadenus altivagus, Theobald.

Limax altivagus, Theobald, J. A. S. B. xxi, 1862, p. 489

Anadenus altivagus, Theobald, Cat Land and Freshw Shells Brit

India, 1876, addenda, p. 1, Nevill, Hand List, i, 1878, p. 65;

Theobald, J. A. S. B. 1, 1881, p. 47, Godwin-Austen, Moll India,
1, 1882, p. 49, pl. 6, fig. 1 (animal), figs. 2-7 (anatomy), pl. 7,
fig. 1 (shell), figs. 5, 6 (animal), Tryon, Man. Conch. ser. 2, 1,
1885, p. 249, pl. 59, fig. 62 (animal), Pilsbry, Proc. Malac. Soc.

London, 11, 1898, p. 95, pl. 7, figs. 1-3, 5-7 (anatomy)

Anademus (Altiragus) altivagus, Cockerell, The Conchologist, 11,
1893, p. 192.

Original description — "Corpore limaciformi, pallio lentegranuloso, dorso rugose reticulato, more frondis brassicæ, colore virescente-fusco sive lutescente-fulvo, interdum nigrescente, et rarissime pallide aurantiaco pallio, minus colorato corpore Tentaculis quatuor nigris, capite nigro, infra pallescente. Ano ad dextrum latus pallii, prope marginem posito, ad mediam partem vix attingente

"Longitudinis (corpore extenso), 9 unc" (Theobald)

Hab. Cissutlej Hills, near Fagu, Narkanda, Saraon, etc., 6000 to 9000 ft

"This Limar is rather variable in colour, and large specimens, when in motion and extended, exceed 9 inches in length, though their ordinary dimensions is about 6 It feeds on fungi"

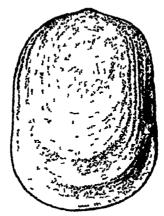


Fig 146 -Anadenus altivagus
(Shell Copied from Land and Freshw Moll India)

This somewhat cursory description is amplified by the excellent

account given by Godwin-Austen as follows -

External description of animal (from spirit specimen) collected at Simla—"Slug-like, rounded above, foot rather pointed behind; no gland, with a narrow segmented pedal margin. Mantle closely fitted to the foot behind, only slightly overlapping on the sides, the neck-lobes only partially developed near the respiratory orifice, with a fine papillate surface. The respiratory and anal orifices

situated together just above the centre of the mantle-margin. The generative orifice at a moderate distance (about 8 or 10 mm) behind eve-tentacle

"Total length 70 0, mantle length 30 0, mantle breadth 20 0 mm

"Largest spec.: Shell quadrate, flat, thm, horny, white, with concentric lines of growth, nucleus on right central margin

"Major diam 150 mm, minor 100 mm

"Odontophore, de The jaw is solid and composed of 13 ribs

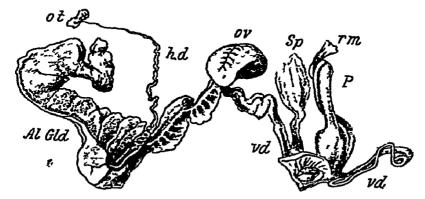


Fig 147 — Anadenus altivagus
(Genital system Copied from Land and Freshw Moll India.)

In the radula the centre tooth is broad, with two small pointed projections at the base, the adjacent laterals are also broad, with

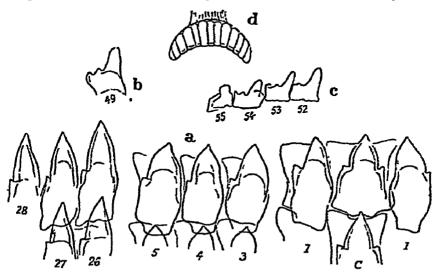


Fig 148—Anadenus altiragus (Jaw and radula Copied from Land and Freshw Moll India)

a single small blunt tooth on the exterior side: about the 28th from the centre they become much more elongated, and the outer basal

472

tooth is rather sharper. The outermost laterals are oblong at the base, with one long blunt tooth and one or two small teeth disunited and separate from it, but rising from the same base. These outer teeth are very characteristic of the genus, for nothing like them is to be found in either Arion or Limax. The teeth of this species do not certainly agree with the radula described and figured by Heynemann; there is a similarity only so far as the straight form of the central teeth, but he distinctly says all the laterals

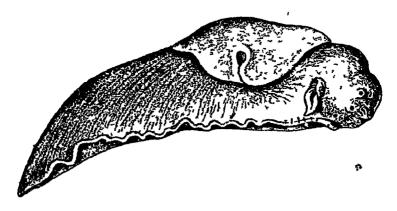


Fig 149.—Anadenus altivagus (Copied from Land and Freshw Moll India)

are straight and with no basal cusp, and he thus figures the 55th of gyanteus, and the 40th tooth of A schlagintwest has this small basal tooth, but he adds that on the extreme laterals it disappears. There were 106 rows in a very complete radula I got out arranged thus —55.1.55

"The jaw and radula are found to be like that of Geomalacus,

to which genus Anadenus has, in this respect, some affinity

"Generative organs. The ovotestis is bilobed, and situate quite within the folds of the liver-lobe, and is of a pale green tint; the hermaphrodite-duct is rather long, a good deal convoluted near its lower end, but is straight for a short distance before it joins the albumen-gland, this organ is very large, and lies on the left anterior side of the animal The oviduct is of the usual form. The yas deferens is given off just above the duct of the spermatheca; it is very long, and is coiled on itself at one point, about the middle of its length; this coil lies well forward on the left anterior side behind the left tentacle, and doubles back on itself, and passing up the side of the male organ enters it at the hard rounded posterior end, close to where the retractor muscle is given off The attachment of this muscle is at the posterior margin of the mantle-cavity; it is so much contracted in the spirit-specimen as to bring the posterior end of the penis close up to it and the attachments of the eye-tentacles, etc. The spermatheca is about the same length as the penis, pear-shaped.

"All the six specimens sent to me from Simla (where they were collected during the rains in June and July, at the period when they are in full activity and development), show the generative orifice much expanded, with the male organ partly protruding This discloses the existence of several small, sharp, curved spines fixed upon the surface of this reversed portion. On further opening the generative ornice these curved spines were discovered to be only the most advanced of a much greater number arranged in two parallel rows and extending upwards, gradually lengthening, and forming part of a very complicated and beautiful arrangement of far longer and stronger calcareous spines The frontal side of this curious apparatus was found covered by a large and longitudinally perforated plate, which had evidently been built up by the union together at their upper and lower extremities of originally parallel spines On the posterior side of this basal portion of the male organ one very large, long, spear-shaped spine was situated, this measured 8 mm. in length. The whole of this complicated structure must therefore be regarded as representing the simple dart-sac with a single dart, as seen in other genera of the Helioide, for the fixed position of the bases of these spines in the integument of the lower swollen portion of the male organ precludes the idea of its being a spermatophore On following the large duct of the penis upwards towards the junction with it of the vas deferens, the end of the penir is seen, occupying the upper swollen portion, so that here we have apparently the penis and the dart-sac almost united together, instead of, as is usual, the dart contained in a distinct and long sac of its own; but this, after all, is only a question of degree, for the transition is seen in such rudimentary pouches of the dart in Helix pisana (vide pl xix, fig. 16, Moquin-Tandon's 'Mollusques de France,' and Helix bulimoides, pl xx)

"Can it be that in this species the great development of spines and this plate has converted this organ into one of a holding or chipping nature on their interlocking or entanglement prior to, or during the act of copulation? for after expansion or protrusion the muscular contraction would draw these spines together very

tightly.

"One of the most interesting points in the anatomy of this species is the relative position of the heart and renal organ, in which respect it has a considerable similarity to what is seen in Arion and Geomalacus, encircling the heart. The position of the ventricle is, however, different, on the posterior edge of the mantle-cavity and directed backwards, it is large and flatly pearl-shaped.

"The renal organ is ovate and is divided into two portions by a main secretory duct, the inner portion forming a nearly complete narrow disk round the ventricle and commencing from near where the aorta is given off. The renal organ is quite free for three quarters of its anterior margin, the dorsal surface being spread over with the network of the pulmonary veins, the ventral surface of the pulmonary sac being shown in the figure. The retractor muscles of the eye-tentacles, odontophore, and penis are all situated in a line close together at the posterior margin of the mantle, and in this they are thus somewhat more like Arion, only that the muscle of the buccal mass has a more posterior position for its attachment." (Godwin-Austen.)

Hab India: Tandiani (Theobald); Changligali, near Murree, Kashmir (Stoliczka); Simla (Godwin-Austen); Nepal (Nevill).

Lieut.-Col Godwin Austen originally considered Anadenus giganteus, Heynemann, the same as Theobald's altivagus, the description as regards texture of the epidermis of the mantle and foot agreeing well, although he admitted that specimens of the former (contracted in spirit) measured from 80 to 100 mm. in length, while the shell was 20 min long and 12 mm broad Theobald also inclined to this view, but Nevill was of opinion that what he considered giganteus, of which he had seen specimens from Nepal, was a larger and distinct species.*

Godwin-Austen, however, subsequently appears to have modified his opinion, for in the copy of his 'Land and Freshwater Mollusca of India,' at the Natural History Museum, is a note in pencil, from his hand, on page 48 as follows—pl vi, fig 1 "Simla This sp. is not giganteus. A sp of true giganteus has been received from

Kadmandu."

The Nepal specimens referred to by Nevill as giganteus, on the other hand, Godwin-Austen named insignis as recorded under A jeidoni.

464. Anadenus giganteus, Heynemann.

Anadenus giganieus, Heynemann, Malak Blätt x, 1863, p 140, pl 1, figs 1 a-1 f (dentition), fig 1 g (interior shell), fig 1 k (part of back), Godwin-Austen, Moll India, 1, 1882, p 48, Tryon, Man Conch ser 2, 1, 1885, pl 59, fig 63 (shell)

Anadenus (Altragus) giganteus, Cockerell, The Conchologist, 11, 1893, p 192

Original description (in German) —" Length of contracted animal 80 to 100 mm Length of the mantle 30 to 40 min

"Colour isabelline, brownish

"Internal shell 20 mm long, 12 mm. wide, flat, very thick

"Jaw with about fourteen ribs, more or less distinct from each

other in front The terminal ribs are fused.

"Radula 110 transverse lows Central tooth slender, longnecked, with a long point and indication of side cusps Laterals scarcely different, inclining towards the middle, with still longer points and similar indications of side cusps. The less developed teeth towards the margin have much longer points but no side cusps.

"The upright position of the points, especially noticeable in the

laterals, is also characteristic of Arion

^{*} Sci Res Second Yarland Mission, Mollusca, 1878, p 21.

"From the size of the contracted animal, from the circumference of the internal shell, and from the size of the teeth-plates it may be assumed with some amount of certainty that this species is of extraordinary length Limaa Donae, Bourguignat, to which a length of from 360 to 450 mm is attributed by its author, has scarcely so large an internal shell in the figure (Res. Mag. pl 8,



Fig 150 — Anadenus giganicus
(Shell Copied from Land and Freshw Moll India.)

June 1861), although I do not suppose that this astounding length could be attained by giganteus. It may be equally striking in the living state from its bright colour, which doubtless does not differ greatly from that of spirit-specimens' (Heynemann)

Hab India Shimpti (Shipki?), Kumaon, Badrinath to

Massuri, Garhwal (Schlagintweit)

Originally Lieut-Col Godwin-Austen considered the present species identical with Theobald's altivagus, but, as recorded under the latter, he subsequently modified his view and admitted giganteus as a distinct form

465 Anadenus beebei, Cocherell

Anadenus beeber, Cockerell, Bull Amer Mus Nat Hist xxxii, 1913, p 617, figs 1-7 (anatomy)

Original description — "Color (in alcohol) warm ochreous, the neck suffusedly blackish above; lateral areas of sole dark plumbeous Mantle irregularly reticulate with deep furrous, body with the usual oblique grooves, the primary ones below and behind the end of the mantle 2-2½ mm apart; sole, except anteriorly, irregularly reticulated with deep furrous, and with very distinct plumbeous lateral areas, which are narrow and obsolescent anteriorly gradually widened caudad, but become narrow at the hind end, in the middle of the animal each lateral area is as wide as the middle one

"Length (in alcohol) 106 mm; length of mantle 36 mm., its width (flattened out) 27 mm, the respiratory orifice 23 mm from anterior end, width of sole 17 mm"

Hab. India · Carhwal, N.W. Prov. (C. W. Beebe)

"Jaw dark chestnut brown, with eight very strong flattened ribs, but the ends (about \(\frac{3}{4} \) mm) ribless. Lingual teeth normal for the genus in general characters; central teeth long and narrow, with the ectocones poorly developed; lateral teeth without or with only poorly developed accessory denticles. Stomach very large, containing vegetable matter, which includes quite large pieces of leaves. Lung normal. Kidney considerably longer than wide. Shell a membranous plate containing minute calcareous granules, much more numerous and smaller than those of Arion. Penis-sac narrow apically, rather abruptly broadening above the middle, the basal part very stout, the inside walls are strongly plicate, and on one side bear very many tapering fleshy filaments.

"By the character of the teeth, and also the oblique lateral grooves of the body (except that in A beebei they are closer together), this resembles A giganteus, Heynemann, but it differs entirely in the shell The jaw of A. giganteus has fourteen ribs, whereas that of A beebei has only eight. The color of the sole is also distinctive.

"A. beeber cannot be the species named A. insignis by Godwin-Austen, but scarcely described, as that is said to resemble A. jerdon, and to differ in the character of the dorsal and lateral

grooves from A. giganteus.

"The shell, jaw and teeth readily distinguish our slug from A altivagus. Pilsbry and Godwin-Austen both show the kidney of A. altivagus as very broadly oval, in A. beeber it is considerably narrower. I do not find calcareous spines in the penis-sac, but instead very numerous tapering fleshy processes. Pilsbry found minute processes in the specimen he dissected, which he referred to A altivagus. The penis-sac in our slug is not at all like that figured by Pilsbry, it is rather similar in type to Godwin-Austen's figure of A altivagus, but differs in the proportion of the parts.

"Comparison with the other Indian species does not indicate any close similarity, and the more recently described A dautzenbergi, Collinge, A sechuenensis, Collinge, and A sinensis, Mollendorff

are also evidently distinct." (Cocherell)

466 Anadenus modestus, Theobald

Limai modestus, Theobald, J. A. S. B. xxi, 1862, p. 489
Linadenus modestus, Theobald, Cat. Land. and Freshw Shells Brit.
India, 1876, addenda, p. 1, Nevill, Sci. Res. Second Yarkand.
Mission, Mollusca, 1878, p. 21, ibid., Hand List, 1, 1878, p. 65,
Godwin-Austen, Moll. India, 1, 1882, p. 53

Anadenus (Altivagus) modestus, Cockerell, The Conchologist, 11,
1893, p. 192

Original description — "Corpore limacitormi, postea acuminato, colore cinereo, fuscis punctis notato; dorso duobus lineis maculosis cateniformibus ornato, a sese et a margine equidistantibus et a pallio usque ad extreinitatem extensis, spatio his lineis incluso

paullo fuscente et elegante fuscis lineis striato et marmorato. Tentaculis quatuor rubro-fuscis.

"Longitudinis 13 unc. [=38 mm]" (Theobald)

Hab India Cissutlej Hills near Fagu, Narkanda, Saraon, etc "It is 'much smaller and rather more elegantly shaped,' and is, perhaps, rather more numerous than altivagus, though this is far from uncommon

"There is a very small species in the British Museum in the same bottle with A giganteus, mentioned above, which appears immature, but is certainly another species. It measures — Potal length 20 mm., mantle 90, breadth 55. It may be distinguished by its olive-brown colour and having the mantle speckled with black, and two well-marked lines of this colour on either side of the extremity of the foot; it agrees well with modestus of Theobald I hope shortly to receive a collection of slugs from Darjeeling which may contain this species, for there is now some doubt whether giganteus of Heynemann was ever obtained there. This may possibly be the young of A schlagintweit, described by Heynemann on p. 141, L.c.; but he does not give any dimensions." (Godwin-Austen.)

467 Anadenus schlagintweiti, Heynemann

Anadenus schlagintweiti, Heynemann, Malak. Blätt. x, 1863, p 141, pl 1, fig 2 a-d (teeth), fig. 2 e (shell), Godwin-Austen, Moll Ind 1, 1882, p 51, pl. 7, fig 3 (shell), Tryon, Man Conch ser 2, 1, 1885, p 250, pl. 59, fig 61 (shell)

Anadenus (2 section) schlagintweiti, Cockerell, The Conchologist, 11, 1893, p 192

Original description (in German) —"Length of contracted animal 45 to 60 mm. Length of mantle 25 mm. Colour ashygrey to blackish

"Internal shell 11 mm long, 7½ mm. broad, moderately thick,

"Jaw with about 16 ribs, the outer coherent, the inner appear somewhat beak-like, in front they are all separate

"Radula, 125 transverse rows, 90 longitudinal rows



Fig 151 —Anademis schlaginiweits.
(Shell Copied from Land and Freshw Moll India)

[&]quot;Central tooth broadly triangular with moderately long points.

Side cusps placed on somewhat broader base. Laterals scarcely different from central tooth, inclined towards the middle. The shape does not perceptibly vary towards the margin, only the side

cusp ultimately vanishes.

"The young animal a black spot occurs on the posterior part of the mantle, terminating in a point anteriorly and enclosing a small area lighter in colour than the rest of the mantle. The sides of the mantle are spotted with black. On both sides the body is marked with a broad, black band, sharply defined towards the back but gradually shading off towards the sole. The back itself is again somewhat darker

"It may be presumed that, as is the case with many European slugs which in their immature state are elegantly coloured in a similar manner, this marking disappears later through darkening

of the rest of the pigment.

"Since the entire collection is comprised of these two species [A. giganteus and A schlagintweiti] and these were obtained in several localities, the genus may be regarded as widely distributed and common." (Heynemann)

Hab India Simla; Simla to Sultanpore, Bias at Bishisht,

Kulu, Bias Kund, Rotang Pass (Schlagintweit)

Lieut-Col Godwin-Austen thinks this species is externally very similar to A. altivagus, but smaller He doubts the Sikkim locality.

468. Anadenus jerdoni, Godwin-Austen.

Anadenus jerdom, Godwin-Austen, Moll India, 1, 1882, p 52, pl 7, fig 7 (animal); Tryon, Man Conch ser 2, i, 1885, p, 250, pl 59, fig 64 (animal)

Anadenus (sudcati) jerdoni, Cockerell, The Conchologist, 11, 1893,

p 192

Original description (trom spirit-specimen) — "Animal large The mantle apparently finely papillate in life. The foot above very coarsely wrinkled, rounded at extremity. No gland. A very narrow pedal margin. The respiratory orifice at the posterior right margin or about one third the length of the mantle from the posterior side. The eye-tentacles would appear to be very large at the base. The mantle viewed from above, is rather circular in form. The foot has a wide central area

"Total length 101 6, mantle 38 0, breadth 31 8 mm.

"Jaw is well ribbed, and 0 2 inch or 5.1 mm wide"

Hab. India: Kashmir (Jerdon)

"There is only one specimen at the British Museum and therefore I am unable to give any details of the anatomy of this species, of which no doubt some will be found in the Indian Museum Collection, Calcutta The gigantic specimens alluded to by

Mr. G. Nevil, in the Molluscan portion of the 'Scientific Results of the Second Yarkand Mission,' under Anad. altivagus, I well remember his showing me in Calcutta They are certainly very distinct from the Simla specimens I have seen, and much nearer A. jerdoni in outward appearance. Heynemann's name would have well suited these gigantic Nepalese slugs; but his description certainly applies to a much smoother animal, so well shown in his figure of a portion of the foot viewed from above (plate I, fig. 1h), and which I reproduce on plate vii, fig. 4. The Nepalese species I propose to distinguish by the name insignis" (Godwin-Austen)

It is rather unfortunate that Lieut-Colonel Godwin-Austen,

when naming this species, did not give a full description.



Fig 152—Anadenus jerdoni (Copied from Land and Freshw, Moll, India)

469 Anadenus blanfordi, Godwin-Austen.

Anadenus blanfordi, Godwin-Austen, Moll India, 1, 1882, p 53, Cockerell, The Conchologist, 11, 1893, p 192

Original description — "From the single spirit-specimen it would appear to have been of a dark ochraceous brown, with some dark grey mottlings on the upper part of the foot. It may be distinguished by the very different arrangement of the warty protuberances on the epidermis, these being well raised, isolated, and elongately diamond-shaped

"Total length 44, length of mantle 16, breadth 11 mm"

(Godwin-Austen.)

Hab India Darjeeling, about 7000 ft. (Blanford)

"There is no doubt of its distinctness from all other species I have seen, but I defer figuring it until I receive a large collection in spirit now on its way from Sikkim" (Godwin-Austen.)

Family PHILOMYCIDÆ.

Genus INCILARIA, Benson,

Limacella, Blainville, Journ Phys Paris, lxxxv, 1817, p 443 (not Limacella, Brard, 1815), Cockerell, The Conchologist, 11, 1893, p 193

Incilaria, Benson, A M N H ser. 1, ix, 1842, p 486

Type, I. bilineatus, Benson

Range India, China

"Body limaciform, entirely naked foot equalling the body, but separated from it by a groove. Orifices of the generative organs distant, connected by a furrow occupying the entire right side of the body." (Blainville)

Professor Cockerell, in his Check-list of Slugs*, has adopted Lamacella, Blainville, 1817, for the present genus, in spite of the fact that Brard had already, in 1815, utilized the name The latter simply being a synonym of Limax, Prof Cockerell considers that the rule "once a synonym always a synonym "should be suspended in this case As this would give rise to confusion I have felt it necessary to substitute the next name available for these oriental slugs, discarding Philomycus, Rafinesque (1820), Tebennophorus, Binney (1842), Pallifera, Morse (1864), Meghatinum, Hasselt (1824), and Eumelus, Rafinesque (1820), the first three applying to American forms and the last two as being insufficiently defined.

470. Incilaria campestris, Godwin-Austen

Philomicus (Incillaria) campestris, Godwin-Austen, J A S B xlv, 1876, p 315, pl 8, fig 3

Limacella campestris, Cockerell, A M N H ser 6, vi, 1890, p 385, 1bid, The Conchologist, n, 1893, p 193

Original description —"No shell. Animal pale ochre, with a longitudinal dark stripe on the side of the body. Tentacles very short, only 0 13" [=35 mm]

"Total length 1.65" [=42 mm]" (Godwin-Austen)

Hab India Kholabari, Daffa Hills, Assam

This cursory description may be supplemented by the following observations by Prof Cockerell, who regarded the form as a subspecies of Limacella bilineata—"Ochraceous yellow, with an obscure dorsal and lateral pale brown band, narrow and more or less interrupted. Sole finely laterally transversely wrinkled. Length 23 millim, respiratory orifice 4 millim from anterior border of mantle; sole 4 millim, broad

^{*} The Conchologist, 11, 1893, pp 193, 215

"Shape of slug cylindrical, tapering posteriorly. Jaw pale, ribbed Differs from confusa in its non-tuberculose sole and different markings and its ribbed jaw Described from five

specimens in the British Museum from Dukhun

"Although Godwin-Austen gives but a short description and rather indifferent figure of his type of campestris from Kholabari. and says nothing about the raw. I think there can be no necessity for considering our Dukhun form distinct from campestris, since, so far as we know, there is not any important difference between Should the type of campestris be found later on not to have a ribbed 12w, it will be time to propose a new subspecific name for the slugs described above The discovery of a group of Lamacella with ribbed law in Asia is very interesting and tends to endorse the opinion that this is not a generic character"

471. Incilaria monticola, Godwin-Austen

Philomicus monticolus, Godwin-Austen, J A S B xlv, 1876, p 315 Limacella monticola, Cockerell. The Conchologist, 11, 1893, p. 193

Original description .- "Animal white, tinged with pale lilac, having intensely black spots scattered over body, with one longitudinal band of same colour along the side, and one central down middle of back; foot white below; tentacles very short, brown, the two lower ones wide apart and very short indeed Extremity of foot pointed"

"Total length 1 inch" [=25.5 mm] (Godwin-Austen) Hab. India Hills bordering Kopili River, North Cachar Hills.

Family VAGINULIDÆ.

Genus VAGINULUS. Férussac.

Vagundus, Férussac, Tabi Syst Fam Limaces, 1821, pp 9, 13, 1bid.,

Vaganula, Fernssac, 1201 Syst. Fam. Limaces, 1821, pp. 9, 13, 101d., Hist. Nat. Moli 11, part 1, 1823, pp. 96π, 96π. Vaganula (em.), Humbert, Mém. Soc. Phys. Hist. Nat. Genève, xvii, 1864, p. 123, Fischer, Nouv. Arch. Mus. Hist. Nat. Paris, vii, 1871, p. 156; 101d, Man. Conchyl. 1883, p. 493 (in part); Sarasın, Land-Moll. Celebes, 1899, p. 72 (anatomy and embryology), Pelseneer, Mém. Acad. Roy. Belg. liv, fasc. 3, 1901, p. 23, pl. 6, fast. 49-56 (anatomy). figs. 49-55 (anatomy)

TYPE, (hrst species) V. taunaisi, Férussac.

Range. India, Burma, Ceylon, Malay Archipelago, South America.

Body more or less elongated oblong in the contracted state.

narrow and linear when extended, acuminate posteriorly, sometimes rounded.

Mantle covering the whole of the upper part of the body, separated from the sides by a lateral margin, smooth and united in the extended state, without internal shell or calcareous particles

Foot consisting of numerous, crowded, narrow, well-marked rings; separated from the sides by a deep furrow and projecting on either side, covering the furrow with a thin edge, sometimes projecting beyond the mantle posteriorly, where it is flat, acuminate or rounded, free and distinct from the side

Head distinct, consisting of a buccal mass, provided with an internal jaw and terminal papilla, disposed in a circle as in Lunaces, consequently without hips or buccal tentacles, it can be withdrawn under the mantle, which, together with the sides and the anterior portion of the foot, forms a kind of case for its 1 eception

Tentacles four, unequal, contractile; the upper pair long, cylindrical, blunt, bearing the eyes at the apex, the lower pair short, slightly lateral, and subpalmate or subdigitate at the extremity.

Pulmonary cavity situate anteriorly on the right side at about two-fifths of the total length, communicating with the outer air by a lateral duct which opens out at the posterior part of the body, between the mantle and the free portion of the foot, in a kind of pocket, where the anal duct, placed below the respiratory duct and separated from it by a membrane, also has its outlet

Generative organs distinct and separate

Orifice of male organ near and below the lower right tentacle Female orifice below the mantle on the right side, near the foot, towards the middle of the body.

No terminal mucous pore.

472 Vaginulus alte, Férusac

Vaginulus alle, Férussac, Tabl Syst Fam Limaces, 1821, p 14, ibid, Hist Nat Moli 11, part 1, 1823, p 96 =, pl 8 A, fig. 8, pl 8 B, fig 6 Vaginula alte, Fischer, Nouv Arch Mus. Hist. Nat vii, 1871, p 157 Veronicella alle, Cockerell, The Conchologist, 11, 1893, p 193

Original description : — "La forme générale de cette espèce se rapproche tellement de celle de l'onchidie du Typha de Buchanan, que nous crûmes au premier coup d'œil que c'étoit elle: vivant dans les mêmes contrées, cette circonstance rendoit notre supposition assez probable; mais l'examen que nous en avons fait, en nous montrant quatre tentacules et une organisation extérieure semblable à celle des especes précédentes, nous tira de Il faudroit supposer, chez le docteur Buchanan, notre eneur une méprise singulière, qui ne peut se piésumer, malgre toute l'analogie extérieure de ces deux limaces Selon Mr Leschenault, la vaginule alté est ainsi nommée, parce qu'elle ressemble à une

sangsue dont le nom du pays est Alté. L'étiquette du Muséum l'indique comme étant des eaux douces, ce qui nous paroit mériter confirmation " (Féi ussac)

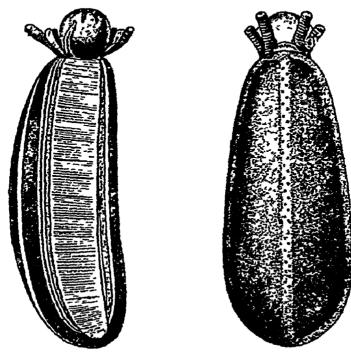


Fig 153 — Vaginulus alte (Copied from Ferussac, Hist. Nat Moll.)

Length 52 mm, breadth 195 mm (ex 100n)

Hab India Pondicherri (Leschenault)

473 Vaginulus frauenfeldi, Semper.

Vaginula frauenfeldi, Semper, Reisen Arch. Philipp 2^{to} Teil, 111, 1885, p 324, pl 27, fig 32

Veronicella frauenfeldi, Cockerell, The Conchologist, ii, 1893, pp 193, 215

Original description (in German).—"Roundly truncated anteriorly and posteriorly; skin rather smooth, the tubercles very small and crowded, each provided at the apex with a pit which, in large specimens especially, is of considerable size. The dorsal surface is greyish-brown with black spots, with a median vellow line which at neither end reaches quite to the mantle. Lower surface light yellowish-brown, upper tentacles bluish-black.

"Length 24 mm, breadth 10 5 mm Sole 4 mm wide , 43 mm., 16 mm. , 6 mm wide" Hab India Madras (Vienna Museum) (Semper) The folds of the foot-sole are at the rate of 40 to 10 mm. In the smaller specimen the female genital orifice is 10 mm distant from the posterior extremity, in the larger one 19 mm., in both it is very near the edge of the foot

474. Vaginulus templetoni. Humberi.

Vaginula --- ?, Templeton, A. M N H ser 3, i, 1858, pl 2 B. fig 6

Vaginula templetoni, Humbert, Mém Soc. Phys Hist Nat Genève, xvii, 1864, p 126 figs 3-3 k. Fischer, Nouv. Arch Mus Hist. Nat Paris, vii, 1871. p 157, Semper, Reisen Arch Philipp. 2° Teil, iii, 1885. p 324 pl 27, fig 32 (anatomy): Jousseaume, Mém. Soc Zool France, vii, 1894, p 268: Collett, J A S Ceylon Branch, xvi, 1900 p 138

Veroncella templetoni, Theobald. Cat Land and Freshw Shells Brit India, 1876, p 33

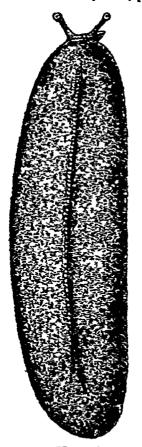


Fig 154.—Vagraulus templetoni. (Copied from Mem Soc. Phys Hist Nat Geneve)

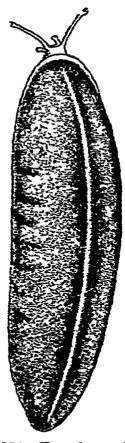


Fig 155 - Vagirulus templeloni (Copied from A M. N. H)

Original description:—Arrondie en dessus, sans carène dorsale bien marquée; une ligne tuberculeuse médiane de couleur claire s'étendant sur les deux tiers environs de la longueur du manteau (dans l'état de contraction) Parties supérieures d'un bruu chocolat, très finement granuleuses Des tubercules un neu plus gros, arrondis, noirs, semés assez regulièrement sur toutes les parties supérieures du manteau; d'autres de même forme et à peu près de même grosseur, mais blancs, sur les régions laterales Parties inferieures du manteau et du pied d'un jaunâtre uniforme. Dessons du manteau très-finement granuleux

"Pédoncles oculaires d'un chocolat clair; tentacules de la môme couleur avec leur appendice inférieure blanchâtre " (Hum-

ber t)

Length 65 mm, breadth 16 mm (animal extended)

Hab Ceylon. Peradema (Humbert, Simon). Ratnapoora (Tem-

pleton)

In contracting the body becomes shorter, broader, and higher. until it assumes an almost spherical shape. Humbert was of opinion that this species is the same as the form from Ratnapoors, figured, but neither usined nor described, by Templeton

It is stated to differ from V maculatus by the following

characters -

1 The colour of the tentacles of the upper parts and especially of the under surface of the mantle

2 The absence of a distinct dorsal keel

3 The dimensions of the granules of the mantle, the largest of which are almost invisible to the naked eve

4. The less attenuated margins of the maptle and by the body less flattening itself against the ground

5 The genital orifice a little nearer to the foot (?)

475 Vaginulus maculatus. Templeton

Vaginula maculata, Templeton, A. M. N. H. ser 3, 1858, p. 49, pl. 2B, fig 1; Humbert, Mem. Soc. Phys. Hist. Nat. Geneve, xvu, 1864, p 123, Fischer, Nouv Arch Mus Rist. Nat Paris, vii, 1871, p 156, Semper, Reisen Arch Philipp 2" Teil, iii, 1885, p 322, pl 27, fig 30 (anatomy), Jousseaume, Mein Soc Zool France, vii, 1894, p 268

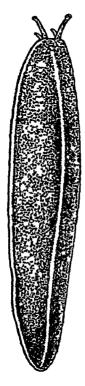
Taginulus maculatus, Nevill, Hand List, 1, 1878, p 198

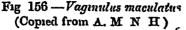
Veronicella maculata, Theobald, Cat. Land and Freshw Shells Brit. India, 1876, p 33, Cockerell, The Conchologist, 11, 1893, p 193

Original description -" Body ovate-oblong, depressed, rounded behind; the dorsum dark or brownish-grey, densely studded with minute papille, speckled with black, angular or irregular macule. a vellow mesial line down the back; margins edged with a yellowish or pale band, superior pair of horns in aline, the buccal pair yellowish-grey.

"The body never makes any approach to linear, even when most extended, it is always rather broad, and fully rounded posteriorly less so at the anterior extremity. There is no

defined margin separating the central part from the edges; the latter are merely a little flatter; there is not the least trace of solid material in the covering or in the substance of the body. The superior pair of horns are cylindrical, somewhat longish, and terminate in a little rounded bulb, on the upper surface of which the minute black eye is imbedded, the buccal pair is bilobed, but not deeply sulcated, appearing exactly as if two short cylinders were under a skin. The foot terminates a little before the end of the mantle, it occupies in breadth about one-fifth or rather





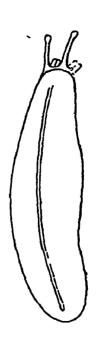


Fig 157 — Vaginulus maculatus (After Templeton)

more of the under surface, and is separated by a deep groove from the mantle, so that it appears as if winged, it has about 200 transverse ruge in the inch, which, in the advancing movement of the animal, present precisely the same appearance as the legs of Julus, a wave running from behind forward, about six ruge forming each wave, with an interval of fourteen to eighteen between them. The under surface of the body of the animal on each side of the foot is covered with minute papille or tubercles, about 180 in an inch.

"The habits of the animal, as far as I had an opportunity of

examining them, appear to differ in no respect from those of Limax" (Templeton.)

Length 51 mm. (ex icon)

Hab. Cevlon · Colombo (Templeton); Point de Galle (Semper);

Peradenia, Ballacadua Pass (Humbert)

The specimen recorded by Humbert was stated to measure: at rest 35 mm long, 18 mm broad: in motion 60 mm, long, 17 mm broad.

476. Vaginulus reticulatus, Westerlund,

Vaginulus retuculatus, Westerlund, Nachr Deuts Malak Ges. 1883, p 49 ibid., Vega Exped Vetensk. Jaktag iv. 1885, v 192

Veronicella reticulata, Cockerelli, The Conchologist, ii, 1893, p. 193

Original description .- "Pallium densissime punctatum, rugosum et granulis parvis confertis obsitum, non carmatum, olivaceum, nigro-maculatum, striga mediana aurantia distincta notatum; infra pallidum, concolor; pes flavidus" (Westerlund.)

Length of mantle (spirit-specimen) 50, breadth 23 mm

Breadth of foot 6 mm

Hab Ceylon. Point de Galle.

Probably allied to, if not identical with, V maculatus. No figure has been published and I have not seen specimens

477. Vaginulus sarasınorum. Simrotli.

Vaginula, n sp (No 3), Simroth, Sitz Ber Naturf Ges Leipzig, 17 & 18 Jahre 1892 p 68 Vaginula earasinorum, Simroth, tom cit. p. 85

Veromcella earasinorum, Cockerell, The Conchologist, 11, 1893,

Original description (in German) :- "Likewise a Pleurocaulier with the highest degree of development of the penis (in consequence of protracted isolation in mountains?) This organ has the aspect of the head and neck of a cock with a very large comb. the orifice being in the bill; the comb, ringed with deep polygonal honey-combs, forms the glans. Dart glands, intestines, salivary glands, etc., similar Papillæ of the dart glands simple, shortly conical Tentacles more or less prominent." (Simroth)

It is unfortunate that no description or figure of the animal of

this species has been published.

478. Vaginulus birmanicus, Theobald.

Vaginulus birmanicus, Theobald, J.A.S.B. xxxii, 1864, p. 243; Nevill, J.A.S.B. xlvi, 1877, part 2, p. 23, ibid, Zool. Res. Two Exp. West. Yunnan, i, 1878, p. 883; Blanford in Nevill, Hand List, i, 1878, p. 199 Veronicella birmanica, Stoliczka, J.A.S.B. xlii, part 2, 1873,

p 34; Cockerell, The Conchologist, ii, 1893, p 193, Collinge, Journ Malac iii, 1894, p 1

Veronicella bai manoi um, Theobald, Cat Land and Freshw. Shells

Brit India, 1876, p 33

Vaginula bir manica, Tapparone Canefri, Ann Mus Civ Genova, sei 2, vii, 1889, p 337

Original description - Corpore elongato, lævi, ante et poue eleganter rotundato, colore fusco, minutissime flavo maculato, Pede transversim rugoso, totius corporis subter albescente longitudinis, sex vix ad quartam partem latitudinis attingente Tentaculis quatuor; binis superioribus fuscis, oculiferis, inferioribus minus elongatis quamquam robustis, et papillam retractilem, sensu acutissimo præditam, subter gerentibus.

"Long 50 mill." (Theobald)

Hab Burma Rangoon, Pegu, Thyet Myo, etc (Theobald). India: Calcutta, Moisraka (Stoliczka, Bhamo (Nevill, Fea) Nevill) Penang (Stoliczka)

"This slug is pretty common at Rangoon and is found harbouring under potsherds, bricks, and rubbish in moist spots."

(Theobald)

Mr Collinge having obtained some spirit-specimens, found the description of the foot sole very inadequate and redescribed it as follows -

"The specimens average from 28 to 38 mm in length and 10 to 18 mm in breadth. The ground-colour is yellowish brown, minutely marked with a series of black dashes and spots, these being absent in the median line of the dorsum, on which runs a pale vellow line Nevill states that the sole of the foot is nearly white, with faint, transverse, white lines; now in the specimen I have, the foot is very similar to the ground-colour of the dorsal surface and it is certainly not white or even pale yellow. The foot sole may be divided into seven distinct parts. On either side is a plain lateral plane, finely and regularly marked, next a distinct line separating the lateral plane from, what I shall term, the inner plane, which is divided in a regular manner by a series of transverse lines or grooves at intervals of about 1 millim The two inner planes stand out more prominently than any other portion of the foot, so that the median plane is somewhat concave, but possibly this is only due to the effect of the alcohol. The median plane is also marked by a series of fine transverse

"In the largest specimen, measuring 38 mm in length and 18 mm in breadth, the lateral planes are 1 mm. broad, the inner

plane 1 mm, and the median plane 1 mm.

"The median plane is really the outer wall of the pedal gland, and passes from just beneath the mouth to the posteriol end of the body, gradually becoming narrower and terminating about 2 mm. from the extreme edge of the foot sole"

479 Vaginulus proximus, Tappaione Canefic

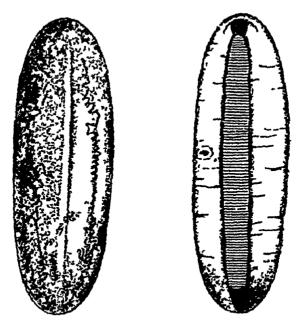
Vaquula proxima, Tappurone Canefri, Ann. Mus. Civ. Genova, ser. 2, vii, 1850, p. 338, pl. 7, figs. 8, 9 (animal). Veronicella proxima, Cocherell, The Conchologist, 11, 1893, p. 193

Original description.—"V. corpore convexiusculo, anguste oblongo, antice posticeque attenuato. Pallium superne minutissime et creberrime granulato-rugosiusculum, fusculum, linea pallida postice evidentiore in medio notatum et utrinque usque ad marginem maculis parvis lineolisque nigrescentibus reticulatum, infra pallidum, unicolor. Pes pallidus, valde angustus, tertiam totus latitudinis partem non nequans, antice subdilatatus, postice in maculam fusco-plumbeam desinens, undique lineis tennibus, crebris, regularibus transverse exaratus. Orificium genitale femmineum, infra, in parte pallii dextera, 2 mill. a pede, parum infra medium totius longitudinis erumpens." (Tapparone Canegri.)

Length 40 mill, breadth 12 mill

Hab Burma Bhamo (Fea)

This species is stated to have great affinity with V birmanica, Theobald, but to differ in the following characters:—(1) It is



Tig 158 — Taginulus proximus & (Copied from Ann Mus Cit Genova)

more contracted in proportion to its breadth, (2) it is less depressed and generally darker in colour, (3) the female genital

orifice is situate below the middle of the total length of the body, whereas in its ally this is exactly in the middle; (4) the foot terminates posteriorly in a blackish point, while numerous specimens of the allied form have the foot entirely of one colour

480. Vaginulus andersonianus, Tappai one Canefi i.

Vaginula andersomana, Tapparone Canefri, Ann Mus Civ Genova, ser 2, vii, 1889, p. 338, pl 7, figs 6, 7 Veromcella andersomana. Cockerell, The Conchologist, ii, 1898, p 193

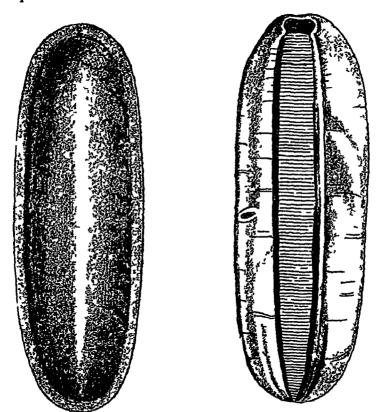


Fig 159—Vaginulus andersonianus 3 (Copied from Ann Mus Civ Genova.)

Original description.—"V. corpore convexiusculo, oblongo, antice posticeque vix attenuato, marginibus lateralibus fere parallelis Pallium superne minutissime et creberrime granulato-corrugatum, maculis confluentibus parvis parum distinctis, sub-nigrescentibus, in seriebus duabus lateralibus ad margines propinquioribus dispositis depictum, linea in medio marginibusque pallidioribus, inferne pallidum, unicolor. Pes pallidus, valde

angustus, transversim regulariter et crebre tenuistriatum. Orificium genitale inferius in parte pallu dextera versus medium 4 mill. a pede erumpens" (Tapparone Canefiri)

Length 59, breadth 18 mill.

Hab Burma Thigran, Upper Iras adds (Fea).

This species is considerably larger than V. proximus and somewhat broader in proportion to its length. The body has almost the shape of an elongated rectangle, the lateral margins of the mantle being nearly parallel, while the anterior and posterior margins are scarcely attenuated and almost truncate. The mantle, in the upper part is densely covered with minute granules and ruge, and marked with small confluent blackish spots, disposed in two lateral series, nearer to the margin than to the median line, which at the middle of the margin is paler. The lower part of the mantle and the foot are pale without a trace of spots. The foot is rather narrow and furnished, as in the other species, with numerous thin transverse strice. The female genital orifice is placed at the middle of inferior right side of the mintle at a distance of about 4 min from the foot.

481 Vaginulus giganteus. Godiem-Austen

Vagandus giganteus, Godwin-Austen, P Z S 1895, pp 443 451

Original description —"Animal elongate in form, female orifice 28 5 mm, from the extremity of the foot, 6 from the middle line of the foot, 15 from the pedal groove. The colour in the spirit-specimen is above grey, with dark mottlings, paler near the head, and a narrow pale line down the centre of the back; below dull ochre. Upper surface smooth to the eye, under the lens closely pitted. The sole of the foot narrow, slightly wider than the adjacent under surface. The foot is crossed by rather close, very regular folds, which form distinct grooves across it, very thin, even in width, there are twenty-two such folds in 10 mm of length, and each transverse fold is divided by a very fine secondary groove. The tentacles, although contracted, are large.

"Total length 68 mm; total breadth 23; breadth of foot 9"

Hab. Andaman Islands. Port Blair (Hayald Godwn-Austen)

Hab Andaman Islands Port Blair (Harold Godwin-Austen)
"This is a remarkably large species, 13 mm larger than
anything described by Semper from the Indian region; the
largest mentioned and figured by him is V. voigtii, described
from a specimen in the Copenhagen Museum Locality unknown.
It differs from Semper's drawing of this species in being narrower as compared with its length, and in the sole of the foot
Semper's drawing is life-size and could not fail to show the
transverse ridges" (Godwin-Austen)

Genus LEONARDIA, Tapparone Canefir.

Leonar dia, Tapparone Canefri, Ann Mus Civ Genova, ser. 2, viii, 1889, p 331

TYPE, L nevilhana, Tapparone Canefii.

Range Burma

Animal resembling that of Vaginulus Body elliptical, depressed, head retractile, lower tentacles scarcely bilobed, mantle carinated at the side, which posteriorly on the lower surface and near the anal orifice exhibits an aperture, which is probably the female genital orifice, differing in this respect from the species of the allied genus Vaginulus

This genus, while in fact very nearly allied to Vaginulus, nevertheless presents important anatomical differences. The author relates an interesting fact communicated to him by Signor Fea, who collected two specimens. Upon being irritated the animal stretched itself, becoming contorted, and ejected a reddish mucilagmous liquid covering the dorsal surface.

482. Leonardia nevilliana, Tappai one Canefri

² Veronicella, n. sp., Nevill, J A S B alvi, 1877, p 23

Leonardia nevilliana, Tapparone Canefir, Ann. Mus Civ Genova, ser 2, vii, 1889, p 332, pl 8, figs 1-3 (animal), pl 7, figs 1-5 (anatomy), Cockerell, The Conchologist, ii, 1893, p. 195

Original description — "L. corpore elliptico-elongato, antice subtriuncato, postice subrotundato Caput infra subalbidum, superne nigrescens, tentaculis pallidioribus Pallium fusculum, interne pallidior, superne colore ad marginem precipue intensiore et undique patina cinerea indutum, obsolete rugosiusculum, papillis minutis rubicundis irregulariter sparsis ornatum, in medio lineam longitudinalem impressam gerens Pes ochraceo-luteus, linea impressa fuscula per longitudinem divisus et undique lineis incisis minutis frequentissimis transversis exaratus" (Tapparone Canefi i.)

Long 98, lat 40 mm. (Larger spirit-specimen) Long 90, lat 31 mm. (Smaller spirit-specimen)

Hab Burma Catein-Cauri Hill, East of Bhamo (Fea).

China Ponsee, Yunnan (Anderson)

The body of this large molluse is of an elongated elliptical form, somewhat truncate anteriorly and regularly curved posteriorly. The head, whitish below, becomes more or less blackish above, but the tentacles are invariably somewhat paler and occasionally may be slightly reddish

The mantle is distinguished from the foot by a yellowish-blown tint and is variously variegated in living specimens, paler at the interior lateral portion, becoming darker above, especially near the margin. A slightly impressed line runs along the middle of the

body. The foot, yellow in living examples, pale yellowish in spirit-specimens, is marked with a brown impressed line in the middle and exhibits numerous impressed transverse equidistant lines

The accompanying figures have been copied from Tapparone Canefri's plates, fig 161 having been prepared from originals drawn on the spot from living specimens by Signor Leonardo Fea.

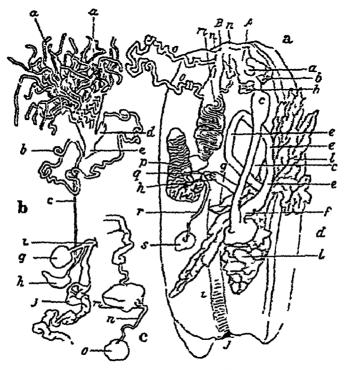


Fig 160 -Leonardia nevilliana (Copied from Ann Mus Cir Genova)

The species is surmised by Tapparone Canefri to have been collected by Anderson, for, from Nevill's remarks, he inferred that the species alluded to by the latter as a Veronicella from Ponsee was identical. A spirit-specimen measured 93 mm. in

length

Reproductive System—As in all the members of this family there are two distinct apertures, one from which the male organ is extruded and the other the female genital orifice. The former, as usual, is situated directly under the inferior tentacle; the exact place where the latter opens out has not been ascertained, but it appeared to communicate with a small cavity situated near the spot where the mantle comes in contact with the foot, exactly above the anal orifice. The duct leading from the orifice to the

base of the ovary likewise has not been ascertained, but no doubt is left that the female genital orifice does not occur on the lower surface of the mantle, as is the case without exception in all Vagnuti, an anatomical feature of sufficient importance to warrant generic separation

The male organ is near the head (fig $160^a B$, m, n, o) and, with the external aperture, placed directly behind the lower tentacle; it consists here of a peris (fig $160^a B$, n), very small as compared with

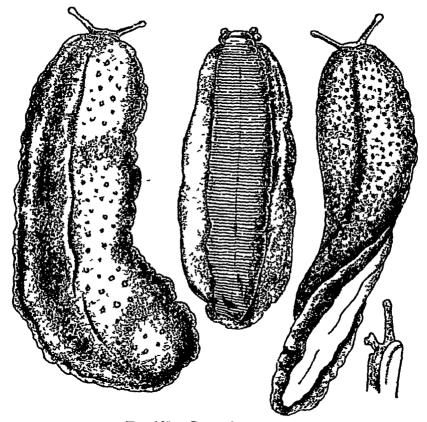


Fig 161.— Leonardia nevilliana (Copied from Ann Mus Civ Genova)

the size of the animal—perhaps dependent upon seasonal change—and a curious and relatively enormous multifid gland (fig. 160° B, m) communicating with it. This gland has also been observed in many species of Vagnulus but in the present case it attains an exceptional development. It consists of a vestibule 7 mm. long, with a diameter of about 25 mm. which gradually increases and from which from 60 to 70 cæca branch off like the roots of a tree-ti-ink (fig. 160° a) of a pearly white, long, filiform (about ½ mm. in diameter), densely ramified, folded upon themselves at various intervals and gathered into a bundle by a pellucid membrane.

This gives rise in this manner to a large body, cylindrical in the middle and attenuated at the two extremities

The vas deferens enters the posterior part of the penus, and is of a deep red (fig. 160° A, o, fig 160° b), relatively large and rather long, and as usual twisted and contorted in various wavs opposite extremity the vas deferens enters the interior of the integument near the multifid gland described above. Here the integument, reduced to a very slender tube (fig. 160bc) with a diameter of little more than half a millimetre, buries itself for a considerable length and descends about as far as the middle of the body, afterwards, upon emerging again, it terminates in the excretory tube of a small reniform gland (fig. 160b h) which enters the duct of another cistiform body which is fixed in the neck of the ovary, and which may be regarded as a female seminal vesicle. The ovary equals in length twice that of the body, but is much more slender, this may be owing to the animal examined not having probably attained full development (fig 160ª B, p, q, fig. 1605 i)

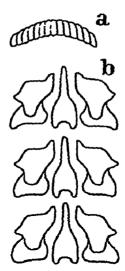


Fig. 162 —Leonardia nevilliana (Copied from Aun Mus Civ Genova)

This long ovary in its natural state, moreover, is folded upon itself and apparently twisted in such a manner as to form a single large body, to which are united the forementioned gland and the albuminous gland (fig 160° B, p), only the hermaphrodite gland, supplied with a long duct, remaining free and directly resting against the liver.

The fact of the vas deferens being concealed for some distance in this integument finds its counterpart in Liminæidæ and in Oncididæ; the genus Leonardia must, in my opinion, be placed near the latter, i c between Oncidium and Vaquiula, having the greatest resemblance and affinity with the latter especially in the general form and several characters (Tapparone Canefri)

Family JANELLIDÆ.

Subfamily HYALIMACINÆ.

Genus HYALIMAX, H. & A Adams.

Hyalimar, II & A Adams, Genera Rec Moll 11, 1855, p 219 (as sub-genus of Limar), Fischer, Journ Conchyl xv, 1867, p 218, pl 10, figs 5-9 (anatomy), Godwin-Austen, Moll. India, 1, 1882, p 55

TYPE, Limax perlucidus, Quoy & Gaimard.

Range. Burma, Andaman and Nicobar Islands, Mascarene Islands.

Ornfice of respiratory aperture in the middle of the right side

of the mantle, animal pellucid. (Adams)

The genus was exhaustively dealt with by Fischer when describing a new form from Bourbon—H. maillaidi. The anatomy being figured in detail at the same time, his account fully supple-

ments the cursory description by the brothers Adams.

"L'animal est long d'environ 15 millimètres; le manteau est formé complètement sur le dos et ne laisse apercevoir aucun rudiment de test, ses bords forment cuirasse en avant et en arrière de la masse viscerale L'orifice pulmonaire est situé à la partie moyenne du rebord du manteau (côte droit); le pied, assez large, se termine en arrière par une pointe, sans pore muqueux. L'orifice genital est placé à droite, à égale distance du grand tentacule et du bord du manteau, en dessous, la tête est séparée du reste du corps par un sillon bien marque

"En enlevant les téguments du dos on découvre une limacelle à peu près arrondie, très-mince, un peu bombee à sa face supérieure, et qui me paiaît manquer de rudiment spiral; mais peut-

être le trouverait-on sur des individus frais

"La mâchoire est visible à l'extérieur par son bord inférieur; elle est très-remarquable et se compose d'un fer à cheval brun, épais, largement ouvert, très-finement strié vers les extrémités, à bord tranchant simple, non festonné, muni d'une deut obtuse à sa partie moyenne Au-dessus du fer à cheval existe une lame ou support subquadiangulaire, allongé, étroit, analogue à celui des Succinea et des genres voisins

"La plaque linguale est construite d'après le type ordinaire des Pulmonés hei bivores; la denticulation médiane est étroite et son bord inférieur est tricuspide, mais les pointes descendent très-peu; les denticulations latérales, plus larges, portent en dedans une pointe assez longue et deux ou trois petites saillies externes; les dents marginales ne consistent plus qu'en séries, presque lineaires, de denticulations égales entre elles et extrêmement, petites. Les dents linguales sont disposees sur des lignes plus obliques que dans

le genre Xanthonyx.

"Les organes genitaux offrent très peu de complication la verge est longue, simple, enroulée sur elle-même; vers son extrémite, on trouve in muscle rétracteur. Le canal deferent la suit dans toute sa longueur et s'accole à une matrice très contournée et festonnée, sans rensiement spécial près de l'orifice commun genital. La glande albuminipare est globuleuse, divisée en lobes tres-nombreux; le canal excreteur de la glande en grappe est très tortueux au point où il s'accole à la glande albuminipare.

"La poche copulatrice, placee à l'extrémité d'un col très-long et simple, est petite, arrondie, un muscle rétracteur s'insère sur

ses parois

"Le mollusque du Bourbon est donc un Limacien par sa coquille complètement interne, mais sa mâchoire le rapproche des Succinea, le peu de complication des organes génitaux etablit un rapport de plus entre ceux-ci et le genre Hyalimax

"Il existe, par conséquent, parmi les mollusques du groupe des Succinea, une serie très-complète analogue à celle des Ai condæ ou

des Limacidae et dont les principaux termes sont -

"1° Coquille contenant entièrement le Mollusque Succinea, Simpulonsis,

"2º Coquile ne recouvrant qu'une portion de l'animal.

Onalonur.

"3° Coquille cachée complètement par le manteau Hyalimar.

"4° Coquille absente ou tout-à fait rudimentaire Janellia,

"La forme de la mâchoire des Hyalimax les distingue de ces divers genres; c'est une combinaison des caractères de celle des Zonites (pour le bord) et des Succinea (pour le support), le genre Hyalimax est donc etabli très legitimement; mais nous sommes certain que MM Adains de pensaient pas, en le creant, qu'il viendrait un jour se ranger auprès des Succinea"

Subgenus JARAVA, Godwin-Austen

Jarava, Godwin-Austen, Moll Indua, 1, 1882, p 59, Cockerell, The Conchologist, 11, 1893, p 195

Respiratory orifice just behind the centre of right side of maintle, a short distance above its lower edge. Anal orifice some distance (3 mm) behind it, and concealed by the maintle, on the right posterior margin.

Jaw without indication of a central projection

Dental formula 265 1 265

Shell ovate, thin, flat, apex solid and quadrate (Godwin-Austen).

498 JANGLIDF

483 Hyalimax andamanica, Godwin-Austen

Hyalımaz (Jaraca) andamanıca Godwin-Austen, Moll India, i, 1882, p 57, pl 11, figs 1-4, Cockerell, A M N II ser 6, vi, 1890, p 389, ibid, The Conchologist, ii, 1893, p 195

Original description — "The animal is thus described by my brother, Mr Harold Godwin-Austen, who sent me four specimens. Pale watery green, yellower on the mantle, with alternate stripes of torquoise-blue and chocolate on the upper part of the neck. These darker lines I suspect are the retractor muscles of the eye-tentacles; the animal when living would appear to have a much

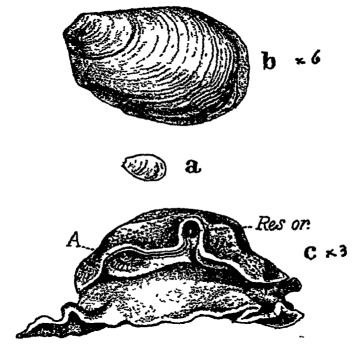


Fig 163—Hyalimax andamanica
a, shell (nat size) b, shell (enlarged) c nnimal.
(Copied from Moll India)

flattened wide foot, thin, and sprending at the margin, for in the spirit-specimen it is much wrinkled; the extremity of the foot is pointed, with no mucous gland. There is no defined pallial margin to the foot; distinct grooves run at intervals from the dorsal edge of the mantle to the side of the foot and two of the specimens show a few distinct dark spots on the upper surface of the extremity of the foot. An indistinct median area on the sole of the foot. Eye-tentacles apparently stout. I am in doubt regarding the oral tentacles, and if present, they are probably small. The mantle is continuous over the shell, and covered with

minute papille; there is no division into right and left shell-lobes; the dorsal lobes are very much reduced in size, the right dorsal lobe particularly so, being very narrow and only extending to the posterior margin, the left dorsal lobe is also very narrow, and only just separated from the mantle, terminating on the left anterior side. The respiratory orifice is just behind the centre of the right side of the mantle, a short distance above its lower edge. The anal orifice is some distance (3 mm) behind it, and concealed by the mantle, its position being quite on the right posterior margin.

"The shell is ovate, thin, flat, transparent, milky white, with close concentric ridges of growth, very thin and delicate on the margin, the apex rather more solid and quadrate at that end, the

nucleus being on the right margin

"Size major diam 5 mm, minor diam. 33 mm.

"Length of spirit-specimen 16, mantle 11, breadth 55 mm" Hab Andaman Islands Port Blair (Harold Godwin-Austen).

"Odontophora, &c—The buccal mass is large, the strong retractor muscle has its attachment, together with that of the eye-tentacles, in the usual position at the posterior side of the maintle-margin; but the posterior portion of the buccal mass is very different to what we find in other species; it is more truncate; and that part where the lingual ribbon takes its origin, and which in all species I have hitherto examined presents a shortish blunt knob like process, in this species is represented by two coils, which are really the posterior edges of the lingual ribbon, turned up on each side and coiled on itself inwards. The lingual ribbon is broader than it is long; and 92 rows were counted, each containing at least 530 teeth:

265 . 1 . 265

"The central tooth is 4-cuspid and much hooked The laterals are all alike, very gradually becoming smaller on the outside; they bend over in a claw-like form, and are edged with four cusps, of which the two outermost are slightly longer than the two inner; a very minute cusp can just be discerned in some of the largest laterals near the centre, at the exterior base of, and next the first long inner cusp.

"The jaw is very peculiar. It is a very dark umber colour; the cutting or frontal edge forms an oblique angle; and the muscular attachment is very strong and extends back at right angles, equal in length to the width of the jaw, which is T-shaped

as in Succinea, &c.

"The heart is situated on the left anterior margin of the mantle. The position of the anus is very far back on the right posterior side, quite removed from the neighbourhood of the respiratory orifice, its usual position in most genera, and this is perhaps the most interesting point in the anatomy of this species. The intestine terminates in a large expanded sac just within the aperture.

500

JANFLEID E. "Generative Organs - The ovotestis, hermaphrodite duct, and albumen-gland were not made out. The orduct is much convoluted for a short distance and then extends in a long straight duct to the generative sperture; the product is of some length, the vas deferens running parallel to the straight portion of the or iduct down to a short bulbons expression, to which it is probable the retractor muscle is given off, but this was not found in either specimen examined. The spermatheen is of very great length; a long thin tube terminating in a round ball-like expansion, which 14 like in this respect to H. maillards. Hyalimas andamanica, however, differs from the Bourbon species (1) in the form of the jan, which has no indication of a central projection, (2) there is considerable divergence in the shell, and I give a drawing of that of H. perlucidus, from Mauritius, received by me from Mr. G. Nevill, which shows the apex to be very attenuate and sharp, and

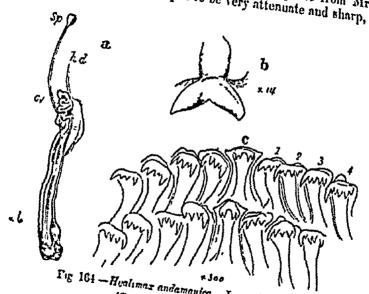


Fig 164 - Hyalimax and amonica Jaw and radula (Copied from Moll India)

there is a distinct greenish epidermis; (3) the dental formula is different; (1) Fischer does not indicate the position of the anal aperture, which, estuated in H. andamanica so far back on the posterior right margin, is of extreme importance, so that if other. wies in Agalirian of Bourton, and in its usual position adjacent to the respiratory orifice, it may render it necessar to place the Indian form in another subgenus, which I would name Jarais, from the name of the aboriginal tribe that inhabited the South Andaman Islands. In this case a subfamily Bracinaciva would include 1. Hyalimax (periscidus, Is'a of France; mauritianus, Isle of France; maillardi, Bourbon), and 2. Jarum (reinho Nicolars; ambananica, Andamans: viribis, Arracan).

"In the form of the buccal mass, the broad radula and its numerous teeth, andamanica resembles in a remarkable manner the curiously formed New Zealand slug Janella antipodarum, Gray, described and figured by Mr C Knight in the 'Transactions of the Linneau Society,' vol xxii, read June 2, 1859, and they all must be regarded, with Succinea and others, as one great group, indicated so well and on such good grounds by Mr P. Fischer." (Godwin-Austen)

Prof Cockerell refers to a specimen in the British Museum, labelled "Andaman Islands, Dr J Anderson," as being typical, but having the mouth strongly curved, colour yellowish-white,

without markings, and the foot slightly orange-tinted.

Var. punctulata, Cockerell

Hyaliman andamanica, var punctulatus, Cockerell, A M N H ser 6, vi, 1880, p 389, ibid, The Conchologist, 11, 1893, p 195

"Yellowish white; foot slightly orange-tinted Minute grey specks on mantle and grey streaks on hind part of body." (Cockerell)

Hab 'Andaman Islands (Anderson).

"The mantle of this specimen is flattish, so that the outline of the slug is greatly depressed compared with the typical one. The jaw does not seem quite like that figured by Godwin-Austen for the type, but I was notable to sufficiently examine it. It seemed to me that it had some sort of central projection. It is possible that punctulatus may be a distinct species; but there is not yet sufficient evidence for classing it as such" (Cockerell)

Nevill refers to a new species of Hyalimax, found by de Roepstorff at the Andamaus but he does not describe it, and it is not, therefore, at all impossible that his slug was the same as the

present species

484. Hyalimax reinhardti, Morch

Hyalimax reinhardti, Morch, Journ Conchyl. xx, 1872, p 314, 1bid, op cit., xxiv, 1876, p 353

Hyalimax (Jarava) reinhardi, Godwin-Austen, Moll India, i, 1882, p 59

Hyalimax (Jarani) reinhardti, Cockerell, The Conchologist, 11, 1893, p 195

Original description — "C linguæforme, postice acuminatum, pallide increscens [virescéns] Ommatophoria cærulea Tentacula brevissima. Pallium ellipticum, prasinum, orificis respiratorio in medio marginis dextri sito. Notæum pedis sulcis radiantibus distantibus et sulco obsoleto peripherico circumdatum. Testa scapulæformis, latere dextro recto. Maxilæ crista muscularis angusta, longitudinis fere dimidium maxillæ

"Long 45 mill; long pallu 22 mill; lat. 11 mill; long. notæi pedis 17 mill. (ex wone)." (Morch)

Hab Nicobar Islands Pulo Panjang and Sambelong.

The species is stated to have been collected on the under side of the leaves of Calderon and other plants with thick leaves. Morch further mentions that the animal generally remains stationary and contracted, assuming an oval form, and that the muscular attachment of the jaw is narrower and more elongated than in *H maillardi*. Fischer

Lieut.-Col. Godwin - Austen considers it very similar to *H. andamanica*, although larger, but until they can be compared together in greater detail he thinks it best to keep them separate.

485 Hyalimax viridis, Theobald.

Limax vii idis, Theobald, J. A. S. B. xxxiii, 1864, p. 244

Hyalimax (Jarava) vii idis, Godwin-Austen, Moll. India, i, 1882,
p. 60, Cockerell, The Conchologist, 11, 1893, p. 195

Original description:—"Corpore expanso, pone acuminato, flavo cinereo Pallio magno, læte colorato viridi-flavo limonis. Tentaculis superioribus, longis, pallidis, oculos parvos nigros gerentibus, et linea pallide smaragdina ad basin notatis. Tentaculis inferioribus minutissimis."

Hab. Burma Pegu.

"This elegant little Limar is very active, and creeps about briskly on the green foliage of the salt swamps, which (i e the

leaves) it resembles in colour." (Theobald.)

Lieut-Col Godwin-Austen thinks there can be but little doubt, from the above description and the habitat, that the species must find a place here; he also considers it would be interesting to learn how far it extends north, and whether Hyalimax occurs in the Sunderbunds.

APPENDIX

To follow No. 186, p 213 .-

Plectotropis arakanensis, Theobald

Helix tapeina, var. arakanensis, Theobald, Couch Ind 1870, pl. 15, ing. 10

Helix (Plecti otopis) arakanensis, Nevill Hand List, 1, 1878, p. 73

Shell conoid, rather narrowly deeply umbilicated, rather solid, rufous corneous, finely and somewhat irregularly striated, densely covered with extremely minute granules above and below. Spire convex, suture impressed in the early whorls, rather shallow in the later ones, apex obtuse. Whorls 5½, the first three rather convex, the later ones becoming gradually fluttened and slightly concave near the lower suture, the underside of the last whorl convex, distinctly concave near the sharp keel, which becomes pinched near the aperture, a little dilated behind the peristome, very shortly and slightly descending in front. Aperture oblique, subhastate; margins slightly approximating, united by a very thin callus on the parietal wall, peristome slightly thickened and reflexed, not expanded, the upper margin slightly curved, outer angular, basal arcuate, columellar obliquely ascending, slightly dilated, but scarcely overhanging the moderate umbilicus.

Major diam 1275, minor 1175, alt 7 mm

Hab Burma. Arakan Hills (Kurz, Blanford), Moulmain

(Stoliczka).

The present form, regarded as a variety of *P* tapena by Theobald, is quite distinct. The umbilicus is narrower, the spire is relatively higher and more convex, the last whorl is not constricted below behind the peristome, the keel is considerably sharper, and instead of close spirals the shell is densely covered with minute granules

The species has never been described and the foregoing description has been drawn up from a specimen acquired by me years ago at an auction sale with other shells. It was labelled "Burma" The specimen figured in Conch Ind is a trifle larger,

measuring 135 mm in diameter

DOUBTFUL AND SPURIOUS RECORDS

Bulimus folliculus, Pfeisfer, Symb Hist Helic III, 1846, p '83; ibid, Mon Helic Viv II, 1848, p 81; Reeve, Conch Icon. v, Bulimus, 1850, pl. 87, fig 644

When described by Pfeisfer, he stated it was received as Carychium costatum, Hutton, from Metcalte. He makes no

forther reference to the epicies in any of the spinement relimes of the filterograph Antheorem. The spine are then is coming the filter elevan, a first considerations be assumed that he of not able it it as a mail species.

Edwa photogram, Beret, LUI.E en 2, in 1987,

2. 8:21.

' Visited material condition Demon that the species year envisor of relevant to Bullove, and he placed in in America (L.M.N.H. ver. 8, II, 1850, p. 1885.

Hapelo tearankeriou, Toestell, J. L. S. B. It, 1878, 7. 188.

V. 34, 52, 5.

Benford states (J. A. S. Berlin, 1889, p. 215), that he is smind-delegistic of a specimens were immature and he becomes from to be the young of Cabridge colordens to respect that allied species.

Helia (Theka) ephylouiden, Beck, Index Moll. 1828, z. 15.

Heli. Branquetar (nom. nud.).

March in Journ. Conchyl. xx. 1872, p 336, states that the Bellev delinei, Romanasaler, a Moroccan species.

Helier lumantizationa, Crist. & Jan, Mantissa, p. 2. Perings a spinite e'e error for lumantiona.

Trachamorphaider consider, Martens, Godwin-Austen, P.Z.S. 1865, p. 450. A Malay Archipelago species recorded by Godwin-Austen from Katchal, Nicobar Group, on the authority of Unpetors.

The following are nomina nuda:-

Helia meneula, Benson, J. A. S. B. 1857, p. 249.

Ilelia petila, Benson, tom. cit. p. 249

Helin precaria, Benson, tom. cit. p. 250

Pupa ceylanensis, Nevill, Enum Helic. Ceylon, 1871, p. 6.

Pupa olrona, Nevill, tom cit. p. 6.

Pupa solitaria, Nevill, tom. cit. p. 6.

Pupa terricolor, Nevill, tom. cit. p. 6.

Januar memnon, Nevill, J. A. S. B. xxxx, 1864, p 244.

ALPHABETICAL INDEX.

All names printed in stalics are synonyms When more than one reference is given, the page on which the description occurs is indicated by thickened numerals

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